PB84-128339

Development of Pilot Inspection System for Virginia State Air Pollution Control Board

PEDCo-Environmental, Inc., Cincinnati, OH

Prepared for

Environmental Protection Agency, Washington, DC

Apr 83

U.S. Department of Commerce
National Technical Information Service
NTIS

TECHNICAL REPORT DATA

(Please read Instructions on the reverse before completing)

1. REPORT NO.

2.

3. RECIPIENT'S ACCESSION NO.
PB84 128339

4. TITLE AND SUBTITLE
Development of Pilot Inspection System for Virginia Air Pollution Control Board

5. REPORT DATE
April 1983

6. PERFORMING ORGANIZATION CODE

7. AUTHOR(S)
Ronald L. Hawks
David R. Dunbar

8. PERFORMING ORGANIZATION REPORT NO.

9. PERFORMING ORGANIZATION NAME AND ADDRESS
PEDCo Environmental, Inc.
505 South Duke Street, Suite 503
Durham, North Carolina 27701

10. PROGRAM ELEMENT NO.

11. CONTRACT/GRANT NO.
68-01-6310
Work Assignment No. 28

12. SPONSORING AGENCY NAME AND ADDRESS
U.S. Environmental Protection Agency
Stationary Source Compliance Division
401 M Street, S.W.
Washington, D.C. 20460

13. TYPE OF REPORT AND PERIOD COVERED
Final Report

14. SPONSORING AGENCY CODE

15. SUPPLEMENTARY NOTES

EPA Project Officer for this report was Mr. Gerald Lappan

16. ABSTRACT

The purpose of this study was fourfold: 1) to evaluate the inspection procedures currently used by the Commonwealth of Virginia in the Region II Office, 2) to train the inspectors in the use of comprehensive inspection techniques, 3) to develop a modified inspection plan for the Region II area, and 4) to analyze the effectiveness of the modified inspection plan with respect to improving continued compliance of the sources located within Region II.

This study was divided into seven major subtasks: 1) evaluation of the current inspection procedures, 2) development of targeting criteria for selecting the sources to be inspected and the level of inspection to be conducted, 3) training of inspectors in the use of comprehensive inspection techniques, 4) field training of inspectors to instruct them in the use of field equipment and the techniques covered in the classroom, 5) development and implementation of a modified inspection plan for Region II, 6) analysis of the modified inspection plan, and 7) preparation of a report describing the study; presenting the methodology, results, and conclusions; and setting forth specific recommendations regarding the application of the methodology to other areas in the Commonwealth of Virginia.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Operation and Maintenance Continuing Compliance Inspections		

18. DISTRIBUTION STATEMENT Unlimited	**19. SECURITY CLASS** *(This Report)* Unclassified	**21. NO. OF PAGES** 189
	20. SECURITY CLASS *(This page)* Unclassified	**22. PRICE**

EPA Form 2220-1 (Rev. 4-77) PREVIOUS EDITION IS OBSOLETE

United States
Environmental Protection
Agency

Office of Air Quality Planning
and Standards
Washington DC 20460

EPA-340/1-83-021
April 1983

PB84-128339

Stationary Source Compliance Series

Development of Pilot Inspection System for Virginia State Air Pollution Control Board

REPRODUCED BY
NATIONAL TECHNICAL
INFORMATION SERVICE
U.S. DEPARTMENT OF COMMERCE
SPRINGFIELD, VA. 22161

EPA-340/1-83-021

Development of Pilot Inspection System for Virginia State Air Pollution Control Board

by

PEDCo Environmental, Inc.
11499 Chester Road
Post Office Box 46100
Cincinnati, Ohio 45246-0100

Contract No. 68-01-6310
Work Assignment No. 28
PN 3560-1-28

EPA Project Officer: John R. Busik
Task Manager: Gerald Lappan

Prepared for

U.S. ENVIRONMENTAL PROTECTION AGENCY
Stationary Source Compliance Division
401 M Street, S.W.
Washington, D.C. 20460

April 1983

DISCLAIMER

This report was prepared by PEDCo Environmental, Inc., Cincinnati, Ohio, under Contract No. 68-01-6310, Work Assignment No. 28. It has been reviewed by the Stationary Source Compliance Division of the Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency and approved for publication. Approval does not signify that the contents necessarily reflect the views and policies of the U.S. Environmental Protection Agency. Mention of trade names or commercial products is not intended to constitute endorsement or recommendation for use. Copies of this report are available from the National Technical Information Service, 5285 Port Royal Road, Springfield, Virginia 22161.

CONTENTS

Page

Figures v
Tables vi
Acknowledgment vii

1. Introduction 1

    Purpose and scope 2
    Goals 2

2. Description of the Study 5

    Geographic area 5
    Sources and emissions 7
    Organization and personnel 7
    Source compliance status 11
    Region II inspection procedures prior to the study 12
    Summary of past inspections 12

3. Methodology 15

    Classroom 15
    Field training 18
    Targeting plan 20
    Analysis of results 25

4. Results 31

    Targeting/modified inspection plan 31
    Inspections conducted 32
    Attitude of the inspector 55
    Attitude of industry concerning comprehensive inspections 60
    Agency approach to continuing compliance 61
    Resources required to implement comprehensive inspections 61
    Impact on air quality 62
    Impact on emissions 63

5. Conclusions and Recommendations 65

    Conclusions 65
    Recommendations 66

CONTENTS (continued)

		Page
Appendix A	CDS output for the Valley of Virginia	A-1
Appendix B	Summary of compliance status for sources in Region II	B-1
Appendix C	Source inspection report form	C-1
Appendix D	Example of inspection reports completed prior to the study	D-1
Appendix E	Agenda for Roanoke classroom instruction	E-1
Appendix F	Workshop examination	F-1
Appendix G	Equipment check list	G-1
Appendix H	Recommended targeting plan	H-1
Appendix I	Example of inspection reports prepared as a result of implementing modified inspection plan	I-1
Appendix J	Letters from industry	J-1
Appendix K	Summary of changes in inspection procedures as a result of the study	K-1
Appendix L	Letters from Regional Director and Director of Compliance	L-1
Appendix M	Selected case histories	M-1

FIGURES

Number		Page
1	Virginia Air Quality Control Regions and Regional Offices	6
2	Example of Form Used to Summarize Information Obtained from File Review and Discussions with Inspectors	26
3	Example of Targeting Plan Tables	27
4	Inspector Interview Form	29

TABLES

Number		Page
1	Valley of Virginia Particulate Matter Emissions	8
2	Job Title, Educational Level, and Experience of Inspectors in Region II	11
3	Region II Modified Inspection Plan	33
4	Results of Virginia Pilot Study - Level 3 Inspections	47
5	Summary of Inspections Using Level 3 Methods	54
6	Summary of Inspector Responses	57

ACKNOWLEDGMENT

This report was prepared for the U.S. Environmental Protection Agency by PEDCo Environmental, Inc., Cincinnati, Ohio. Mr. John Busik was the EPA Project Officer. Mr. George Jutze served as the Project Director, and Mr. Ronald Hawks was the Project Manager. The principal authors were Mr. Ronald Hawks, Mr. Gary Saunders, and Mr. David Dunbar. The authors wish to thank the Commonwealth of Virginia Air Pollution Control Board for its cooperation in conducting this study. In particular, the authors would like to thank Mr. William Jewell, Director of the Division of Compliance, Mr. Donald Shepherd, Director of Region II and the inspectors in Region II for their interest and effort in completing this study.

SECTION 1

INTRODUCTION

Over the past several years considerable concern has been raised within the air pollution control community as to whether sources are properly operating and maintaining their control equipment. Some concern has also been raised regarding whether sources are complying with the applicable emission limits on a continuous basis. In many cases sources can fine-tune their control systems and make the necessary adjustments to comply with the emission limits during stack tests conducted to certify compliance with the applicable emission limits. Once these tests have been completed, however, the control efficiency of the systems may begin to deteriorate and sources may no longer have ongoing incentives to be in compliance with the applicable emission limit.

Reasons for the possible deterioration of the control system efficiency include lack of good operation and maintenance (O&M) procedures, poor or virtually no maintenance, poor design, lack of understanding on the part of the control equipment operator, lack of reliable instrumentation, poor recordkeeping, and little or no evaluation of the records that are kept.

Failure of sources to maintain continuing compliance is a matter of deep concern to State and local agency officials because it can affect their ability to attain and maintain National Ambient Air Quality Standards (NAAQS). Thus, many State and local agencies are looking for ways to improve their surveillance, inspection, and enforcement programs to encourage source owners to operate and maintain their control equipment properly, to maintain adequate records and to use these records to avoid significant operating problems, and to comply with all applicable emission limits and visible emission standards on a continuing basis.

Several States have expressed concerns over continuing compliance but the Commonwealth of Virginia Air Pollution Control Board specifically requested the Stationary Scurce Compliance Division (SSCD) to have an evaluation performed of their existing inspection program and help them to develop a continuing compliance program within the Commonwealth.

1.1 [illegible]RPOSE AND SCOPE

As part of their effort to provide information to State and local agencies on ways to improve their existing inspection and surveillance programs and to assist them in their efforts to obtain continuing compliance, SSCD issued a task to perform this work. The purpose of this task was to evaluate and field test inspection procedures and analysis methods developed by PEDCo over the past several years to improve the overall effectiveness of air compliance inspections. The area selected for evaluation and study was the Commonwealth of Virginia's Region II Office headquartered in Roanoke.

The purpose of this study was fourfold: 1) to evaluate the inspection procedures currently used by the Commonwealth of Virginia in the Region II Office, 2) to train the inspectors in the use of comprehensive inspection techniques, 3) to develop a modified inspection plan for the Region II area, and 4) to analyze the effectiveness of the modified inspection plan with respect to improving continued compliance of the sources located within Region II.

This study was divided into seven major subtasks: 1) evaluation of the current inspection procedures, 2) development of targeting criteria for selecting the sources to be inspected and the level of inspection to be conducted, 3) training of inspectors in the use of comprehensive inspection techniques, 4) field training of inspectors to instruct them in the use of field equipment and the techniques covered in the classroom, 5) development and implementation of a modified inspection plan for Region II, 6) analysis of the modified inspection plan, and 7) preparation of a report describing the study; presenting the methodology, results, and conclusions; and setting forth specific recommendations regarding the application of the methodology to other areas in the Commonwealth of Virginia.

1.2 GOALS

The study had three goals. The first was to develop an inspection and continuing compliance program that could be effectively implemented by the

Region II staff given their current level of experience and education supplemented by the acquisition of additional equipment and the presentation of classroom and field training instruction. The second was to develop a plan that would 1) identify previously undetermined violations, 2) reduce excess emissions resulting from noncompliance, 3) reduce excess emissions resulting from process and/or control equipment malfunctions, 4) change the attitude of the sources with respect to continuing compliance, and 5) improve ambient air quality. The third goal was to develop a plan that could be applied to the entire Commonwealth of Virginia.

The modified inspection plan or program was to be implemented over a 120-day period, and the results were to be reviewed and evaluated with respect to accomplishing the above objectives of the overall continuing compliance plan for the Region II Office.

SECTION 2

DESCRIPTION OF THE STUDY

This section describes the study. It includes a description of the geographic area, a summary of the sources located within the study area and their associated emissions, the Region II organization and personnel involved in inspections, the general compliance status of the sources at the beginning of the study, the inspection procedures currently used in Region II, and a summary of the types of inspections conducted over the past several years.

2.1 GEOGRAPHIC AREA

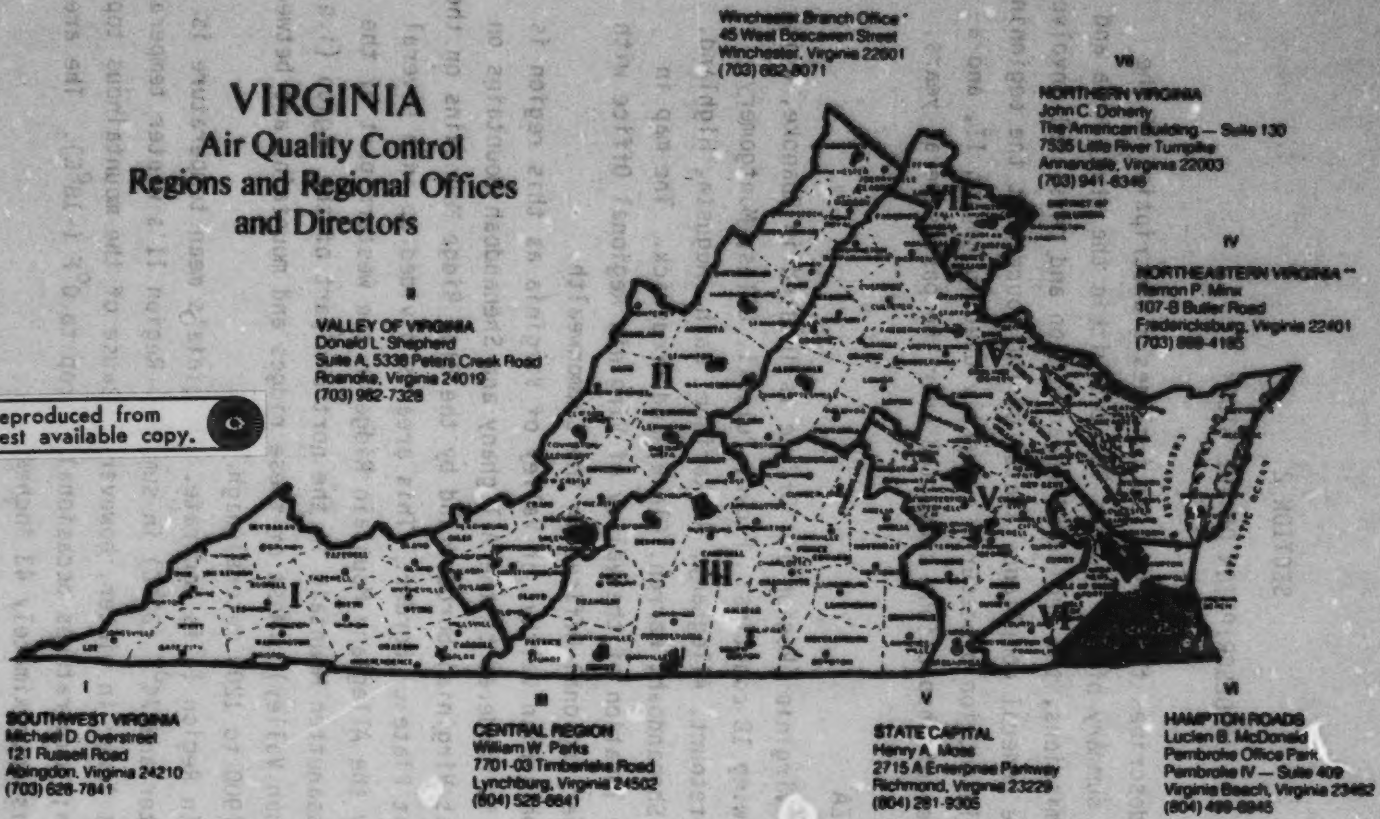
The Valley of Virginia (Region II) Office is located in Roanoke, which includes the following 18 counties: Floyd, Pulaski, Giles, Montgomery, Roanoke, Craig, Botetourt, Alleghany, Rockbridge, Bath, Augusta, Highland, Rockingham, Page, Shenandoah, Warren, Clark, and Frederick. The map in Figure 1 shows the location of the Valley of Virginia Regional Office with respect to the other Regional Offices in the Commonwealth.

The Great Appalachian Valley, or Valley of Virginia as this region is sometimes called, is bordered by the Alleghany and Shenandoah Mountains on the northwest (West Virginia) border, and by the Blue Ridge Mountains on the southwest (Piedmont Plateau) border. This area is divided up into several smaller valleys by the Alleghany Mountain Ridge in the western part of the region and the Massanutten Mountain in the northern part of the region (i.e., the upper Shenandoah Valley). Most of these ridges and mountains are between 3000 and 4000 ft (900 to 1200 meters) high.

The climate in Region II is moderate. Virginia's mean temperature is 37°F (3°C) in winter and 74°F (23°C) in summer. Region II's winter temperatures are somewhat lower in winter, however, because of the mountainous topography of the area; temperatures occasionally drop to 0°F (-18°C). The area's average rainfall is approximately 43 inches.

Preceding page blank

Reproduced from
best available copy.


VIRGINIA
Air Quality Control
Regions and Regional Offices
and Directors
Winchester Branch Office *
45 West Boscawen Street
Winchester, Virginia 22601
(703) 662-8071
VII
NORTHERN VIRGINIA
John C. Doherty
The American Building — Suite 130
7535 Little River Turnpike
Annandale, Virginia 22003
(703) 941-6346
IV
NORTHEASTERN VIRGINIA **
Ramon P. Minx
107-B Butler Road
Fredericksburg, Virginia 22401
(703) 899-4185
II
VALLEY OF VIRGINIA
Donald L. Shepherd
Suite A, 5338 Peters Creek Road
Roanoke, Virginia 24019
(703) 982-7328
I
II
III
IV
V
VI
VII
ATLANTIC OCEAN
I
SOUTHWEST VIRGINIA
Michael D. Overstreet
121 Russell Road
Abingdon, Virginia 24210
(703) 628-7841
III
CENTRAL REGION
William W. Parks
7701-03 Timberlake Road
Lynchburg, Virginia 24502
(804) 528-6641
V
STATE CAPITAL
Henry A. Moss
2715 A Enterprise Parkway
Richmond, Virginia 23229
(804) 281-9305
VI
HAMPTON ROADS
Lucien B. McDonald
Pembroke Office Park
Pembroke IV — Suite 409
Virginia Beach, Virginia 23462
(804) 499-6945

Boundaries are official region boundaries.

* Winchester branch, physically in Region II, is administratively under Region VII; serves Clarke, Frederick, Page, Shenandoah and Warren Counties and city of Winchester.

** Eastern Shore counties – Accomack and Northampton – physically in Region IV, are administered under Region VI.

Figure 1. Virginia Air Quality Control Regions and Regional Offices.

The Commonwealth of Virginia Air Pollution Control Board has been conducting ambient air monitoring throughout the Commonwealth since January 1968. The annual geometric mean of total suspended particulate in the Valley of Virginia is typically 40 to 70 $\mu g/m^3$. The 24-h SO_2 levels are on the order of 0.02 ppm, and the maximum 1-h CO level is 6 ppm.

2.2 SOURCES AND EMISSIONS

The Compliance Data System (CDS) for the Valley of Virginia Regional Office currently contains 360 sources (Appendix A). Approximately 106 of these sources are listed as Class A.

Class A sources are divided into three types; Class A1(a) sources are those stationary sources whose actual emissions after controls are equal to or exceed 100 tons/yr of any pollutant regulated under the Clean Air Act. Class A1(p) sources are those stationary sources whose potential emissions after control would be equal to or exceed 100 tons/yr of any pollutant regulated under the Act if the facility were operated at designed capacity (24 hours/day, 365 days/yr). Facilities which are legally restricted to a specified operating level should be evaluated on that basis. Class A2(p) sources are those stationary sources whose uncontrolled emissions while operating at the design capacity are equal to or exceed 100 tons/yr for any regulated pollutant whose actual emissions are less than 100 tons/yr (i.e., uncontrolled greater than 100 tons/yr but maximum actual less than 100 tons/yr).

The particulate matter emissions for the Valley of Virginia are approximately 90,000 tons/yr. The unpaved roads account for about 36 percent of these emissions and mineral products industry and external fuel combustion account for another 18 percent and 15 percent, respectively. Table 1 summarizes the particulate matter emissions by major source category.

2.3 ORGANIZATION AND PERSONNEL

In addition to the main office located in Roanoke, the Valley of Virginia has a branch office located in Winchester. The Winchester Office serves Clarke, Frederick, Page, Shenandoah, and Warren Counties in addition to the city of Winchester. Because the Winchester Office is administratively under

TABLE 1. VALLEY OF VIRGINIA PARTICULATE MATTER EMISSIONS[a]

Source category	Emissions, tons/yr
EXTERNAL COMBUSTION	
Residential fuel - area	
Anthracite coal	11
Bituminous coal	172
Distillate oil	72
Natural gas	11
Wood	1,426
Electric generation - point	
Bituminous coal	65
Industrial fuel	
Anthracite coal - area	0
- point	0
Bituminous coal - area	868
- point	9,744
Lignite - point	0
Residual oil - point	1,200
Distillate - point	97
Natural gas - area	19
- point	7
Process gas - area	0
- point	0
Coke - point	0
Wood - point	85
Liquid petroleum gas - point	0
Bagasse - point	0
Other - point	0
Commercial-institutional fuel	
Anthracite coal - area	1
- point	0
Bituminous coal - area	0
- point	195
Lignite - point	0
Residual oil - point	33
Distillate oil - area	1
- point	15
Natural gas - area	7
- point	0
Wood - area	0
- point	0
Liquid petroleum gas - point	0
Miscellaneous - point	0
INTERNAL COMBUSTION	
Electric generation	0
Distillate oil	0
Natural gas	0
Diesel fuel	0

(continued)

TABLE 1 (continued)

Source category	Emissions, tons/yr
Industrial fuel	
Distillate oil	0
Natural gas	0
Gasoline	0
Diesel fuel	0
Other	0
Commercial-institutional	
Diesel fuel	0
Other	0
Engine-testing	
Aircraft	0
Other	0
Miscellaneous	0
INDUSTRIAL PROCESS - POINT	
Chemical manufacturing	1,020
Food/agriculture	614
Primary metal	0
Secondary metal	659
Mineral products	22,069
Petroleum storage/transport	90
Wood products	194
Organic solvent evaporation	138
Metal fabrication	0
Textile manufacturing	21
Other/not classified	419
SOLID WASTE DISPOSAL	
Residential - area	1,985
On site incineration	37
Open burning	1,948
Commercial-institutional - area	57
- point	12
On site incineration - area	57
- point	12
Industrial - area	56
- point	18
On site incineration - area	47
- point	18
Open burning - area	9
- point	0
TRANSPORTATION - AREA	
Land vehicles	
Gasoline	
Light vehicles	11,157
Light duty trucks	3,332
Heavy vehicles	758
Off highway	26
Diesel fuel	
Heavy vehicles	2,256
Off highway	170
Rail	197

(continued)

TABLE 1 (continued)

Source category	Emissions, tons/yr	Source category	Emissions, tons/yr
Aircraft	2		
Civil	2		
Vessels	0		
Gasoline	0		
MISCELLANEOUS - AREA			
Forest fires (wild)	89		
Forest managed burning	1		
Structural fires	137		
Slash burning	1		
Frost control	0		
Solvent evaporation loss	0		
Unpaved roads	33,154		
OVERALL TOTAL: -AREA	55,965		
-POINT	36,695		
	92,660		

---

[a] 1975 National Emissions Report, EPA-450/2-78-020, May 1980.

the direction of Region VII located in Annandale, Virginia, it was not included in this study.

The Region II staff consists of a regional director and five engineers or air pollution control officers, who are responsible for conducting the inspections in Region II. Table 2 lists the job titles of individuals responsible for the inspections and their educational level(s) and experience.

TABLE 2. JOB TITLE, EDUCATIONAL LEVEL, AND EXPERIENCE OF INSPECTORS IN REGION II

Inspector identification number	Position	Degree	Years experience
1	Regional Air Pollution Engineer	B.S., Engineering	8
2	Air Pollution Control Officer	High school	11
3	Air Pollution Control Officer	B.S., Environmental Science/Park Recreation	7
4	Chemist/Field Representative	B.A.	13
5	Assistant Regional Director	B.A.	11

2.4 SOURCE COMPLIANCE STATUS

Based on the information provided by the Region II staff at the beginning of the study, all Class A sources were determined to be in compliance. Determinations of compliance were based on one or more of the following: stack test, visible emission observation, source certification, plant inspection, and material balance (Appendix B).

In the past, the Region II staff generally conducted on-site inspection of Class A sources at least once a year. Appendix C is the typical source inspection report form used to report the information obtained during an inspection. This form, along with any narrative discussion, is generally placed in the inspection file at the completion of each inspection.

2.5 REGION II INSPECTION PROCEDURES PRIOR TO THE STUDY

Prior to the study Region II inspectors were conducting Level I inspections with a few Level II inspections where plant instrumentation were available. The inspectors did not measure any operating parameters directly nor did they conduct any internal inspections of electrostatic precipitators (ESP's) or fabric filters. The sole indicator of compliance was visible emissions using EPA Method 9. In some cases the results from performance tests were used where available. As a result of conducting Level I inspections, the inspectors were not able to readily detect potential violations of the particulate emission standards (mass emission limitations) or to detect potential O&M problems that could affect the overall performance of the control equipment.

Most inspections were initiated as a result of Regional priorities to determine the compliance status of the major sources in Region II. A few inspections were also conducted to determine compliance with applicable new source permit conditions or to investigate a formal complaint received against a source.

The results of the inspection were typically summarized on an inspection form (Appendix C) and the results passed on to the Regional Director for his information and review. In a few cases, more detailed narrative inspection reports were prepared depending on the results of the inspection.

2.6 SUMMARY OF PAST INSPECTIONS

Prior to the study, the inspection reports were generally limited to inspection form and possibly one or two pages of narrative. Appendix D contains several examples of inspection reports that were prepared and submitted prior to the beginning of the study.

As noted, the inspections were generally limited to visible emission observations and a physical inspection to verify that all required control equipment had been installed and that it appeared to be operating properly. As noted above, all sources were determined to be in compliance although some limited short-term compliance problems were noted in a November 1981 CDS

Quick Look Report for sources (Appendix B) but these problems were corrected according to the Region staff and all sources were certified to be in compliance by the Region II Director at the beginning of the study.

SECTION 3

METHODOLOGY

This section outlines the methodology and technical approach used to analyze the effectiveness of the modified inspection plan for Region II. The methodology is composed of four basic elements: 1) classroom instruction, 2) field training, 3) development and implementation of targeting (modified inspection) plan, and 4) analysis of the results with respect to specified criteria.

3.1 CLASSROOM

On October 13-15, 1981, PEDCo provided classroom instruction to Region II staff and others within the Commonwealth of Virginia on the inspection and operation of air pollution control equipment. Seventeen individuals attended the classroom training. The informal classroom instruction included discussions on plant inspection techniques, inspection and evaluation of control equipment, and information and special concerns regarding O&M of industrial boilers, cement plants, and kraft pulp mills. Appendix E is a copy of the agenda for the classroom instruction.

The discussions and lectures on comprehensive inspection techniques included specific lectures on how to acquire data on such key control equipment operating parameters as pressure drop, velocity, and secondary current and voltage. The inspectors were instructed on how to use hand-held inspection equipment (e.g., tachometers, ampmeters, pressure gauges, oxygen analyzers, and thermocouples). The inspectors were also instructed on how to establish and use an inspection filing system and what types of data should be contained in these files (e.g., flow charts, emission point identification, and inspection chronology). Procedures were also presented on how to evaluate certain factors that affect control equipment performance including resistivity, scrubber throat wear, bag failures, and poor control equipment design.

Preceding page blank

Several lectures were also presented on conducting a baseline assessment and observing performance tests. In particular, the inspectors were instructed on how to establish a baseline for certain key control equipment operating parameters for determining the acceptability of a given performance test. The inspectors were also instructed on how to use the baselining concept to determine whether a performance test is representative of actual operating conditions. Finally, procedures were presented on how to analyze O&M records for evaluating performance trends and the frequency of malfunctions.

The lecture on the inspection of fans and ventilation systems presented information on the operating theory of the four basic types of fans, relationship between rpm and static pressure, flow, and horsepower, the use of fan operating data to determine gas volume through the control equipment, and the use of hand-held instruments to obtain fan measurements. The limitations of using fan analysis for flow determinations were also presented. Finally, information and procedures were presented on how to analyze the operation of a ventilation system and the types of malfunctions that are frequently encountered.

The lecture on the inspection of mechanical collectors presented information on the theory of inertial collecting devices and effects of certain key operating parameters (e.g., velocity, diameter, flow, and pressure drop) on control equipment performance. The lecture also addressed the typical malfunctions associated with mechanical collectors and the effect of these malfunctions on mechanical collector performance. Specific mechanical collector inspection procedures were presented which included procedures on how to conduct an internal inspection of a mechanical collector. The inspection procedures specifically noted which operating parameters should be recorded as part of the inspection (e.g., pressure drop, flow, and opacity).

The lecture on the inspection of wet scrubbers presented information on the operating theory of wet scrubbers, typical operating parameters (e.g., water flow rate, throat velocity, superficial velocity, and pressure drop) and their effect on scrubber performance, the major components of a wet scrubber system (fan, scrubber section, demister, presaturator pump, valves, and sump), and the typical malfunctions associated with wet scrubbers and their effect on performance. Inspection procedures for determining scrubber performance using such operating parameters as pressure drop, flow rate, water flow, and gas and water temperature were also presented along with formulas for calculating throat velocity, liquid-to-gas ratio, and pressure drop. Finally, procedures were presented for conducting internal inspections of wet scrubbers.

The lecture on the inspection of ESP's presented information on operating theory, the major components (plates, wires, shell, hopper, rappers, transformer-rectifier sets, and controller systems), instrumentation (primary voltage, primary current, secondary voltage, secondary current, and spark rate), typical operating parameters and ESP malfunctions and their effect on performance. Several diagnostic tools were presented that can be used to evaluate ESP performance (air-load and gas-load tests, V-I curves, gas volume calculations, power level distribution, and effects of resistivity changes on power levels). Procedures were also presented on how to: 1) reduce ESP data taken during the inspection, 2) perform the necessary calculations, and 3) conduct internal inspections of an ESP.

The lecture on the inspection of fabric filters presented information on the theory of particle collection by filtration, the major components, cleaning methods, fabric selection, physical properties of the dust, indicators of the system performance, and typical malfunctions and their effect on performance. Specific diagnostic and calculation procedures were presented for evaluating pressure drop, air-to-cloth ratio, and external conditions. Finally, procedures were presented on how to conduct an internal inspection of a fabric filter and the items that should be noted during an internal inspection (e.g., clean side deposits, bag tension, corrosion, and air inleakage).

The discussion and lecture on the use of opacity as an indicator of control equipment performance presented information on the theory of opacity and the limitations of opacity as the sole diagnostic tool. Special discussions were presented on detached and secondary plumes. Procedures were also presented on how to develop and evaluate mass versus opacity relationships.

Two special industrial source lectures were provided on cement plants and kraft pulp mills. These lectures presented information on the process chemistry, the description of the process, the key parameters for each process, and the procedures for reducing the acquired inspection data.

A special lecture was also provided on the safety aspects of inspections. This lecture presented information on the safety equipment that should be used, special hazards that may be encountered during an inspection, and confined area entry procedures.

After the discussions and lectures, an examination was given to each student to evaluate his or her understanding of the material presented during the classroom instruction. Appendix F contains a copy of the examination. The highest test score was 87 percent, the lowest was 28 percent, and the mean was 54.5 percent. The mean score for the Region II staff was 64.7 percent. Five of the six highest scores were made by Region II personnel.

3.2 FIELD TRAINING

After the classroom instruction, PEDCo conducted a series of field training exercises to instruct the five inspectors in the use of the techniques and procedures presented during the classroom session. PEDCo also made arrangements for the Region II Office to purchase the necessary instruments and equipment to conduct the type of inspections called for during the classroom session. The equipment included a set of magnehelic gauges, ammeter, thermometer (dial and digital type), hand-held tachometer, and Fyrite® test kit. PEDCo also provided an equipment check list (Appendix G) to aid the inspectors in organizing and preparing for future detailed plant inspections.

The field training involved two sessions. The first session was held November 15-20, 1981; the second was held May 24-29, 1982. The field training consisted of three basic elements: 1) brief discussion with plant personnel, 2) inspection of the plant and associated process and control equipment, and 3) post inspection debriefing.

Because the Region II Office staff made the arrangements for the field training plant visits, plant personnel were generally aware of the training nature of the inspection as compared with a compliance or enforcement type inspection. After the initial introductions, PEDCo explained to the plant personnel the type of measurements that would be acquired and if any additional sampling locations would be needed. The safety requirements for the inspection were discussed as was the need to comply with all plant rules and regulations regarding safety. Information on equipment design and operating characteristics also was obtained at this time.

The plant inspection usually centered on one or two pieces of the equipment, especially if the plant had several different processes. Limiting the inspection to one or two pieces of equipment enabled the field training to focus on the interrelationship between various design and O&M considerations. The inspector was instructed on how to obtain and review the data available from the instrumentation that may be installed at a particular facility (e.g., pressure drop, fan rpm, ESP power input). The inspector was also instructed in the use of various hand-held equipment. In particular, the inspectors were required to take measurements using the Fyrite® and hand-held tachometer and to use the data obtained to perform various calculations.

As each measurement was taken, a discussion was presented regarding use of these measurements in evaluating the overall operation and performance of the source. Throughout the field training, the operating and design principles of the equipment were reinforced as were the procedures for comparing the design data with the data obtained during the inspection to enable the inspector to identify potential problems and associated symptons. Potential O&M problems also were identified.

In many cases, plant personnel accompanied the Region II inspectors on the actual inspection. When this occurred, plant personnel were questioned concerning the kinds of problems they may have encountered and the maintenance history of the equipment. These questions were asked to give the inspector an idea of the type of information that should be obtained during an inspection.

In those cases where the equipment was not in operation or there were no potential hazards, an internal inspection of the control equipment was conducted. The purpose of the internal inspection was to give the inspector a firsthand perspective on design considerations as well as operating and maintenance problems. Internal inspections (which were generally limited to fabric filters and multicyclones) were informal and stressed the exchange of information and the need for a cooperative effort on the part of the Commonwealth and the source.

Immediately after the actual inspection was conducted, a second meeting was held with the plant and Commonwealth personnel to discuss the preliminary findings of the field training inspection. This second meeting provided an opportunity for the Commonwealth and plant personnel to obtain a better understanding of the need for detailed plant inspections and how the data from these inspections can be used to correct current problems and avoid future problems.

At the end of each day of field training, the data obtained during that day were reduced and sample calculations were performed to illustrate how the data can be used to relate various design and operating conditions to continuing compliance and to assess the overall performance of the source.

3.3 TARGETING PLAN

Based on a review of the Region II permit and inspection files and a discussion with the regional staff, PEDCo developed a targeting plan for conducting future inspections in Region II. The targeting plan (i.e., level of inspection and frequency) was developed to optimize the use of the current manpower and to ensure continuing compliance of those sources that would have the greatest impact on air quality and overall emissions in the Region. The level of inspection recommended is usually different for each individual emission point at the source, depending on the control equipment, process equipment, and the expected level of maintenance.

3.3.1 Levels of Inspection

Five levels of inspection (0, 1, 2, 3, and 4) were recommended for each source or process within each source along with the frequency of inspection. The procedures associated with each level of inspection are explained.

Level 0--

Level 0, the lowest level of inspection, consists of an annual determination of the continued operation of the source and its annual process throughput. The purpose of this inspection is to obtain information on those sources that do not operate emission control equipment. Level 0 inspections can be used for petroleum storage facilities, paint spray booths, drying ovens, or uncontrolled degreasing facilities.

Level 1--

Level 1 is considered a screening inspection for identifying violations of emission standards that can be related to visible emissions. The inspection is usually limited to the evaluation of visible emissions from process vents, fuel combustion sources, incinerators, and fugitive emission sources. This type of inspection can be used to enforce opacity standards or particulate standards when a correlation between opacity and mass emission rates has been established. This inspection requires a minimum of time and manpower and places a minimum of regulatory pressure or involvement on the source. This level of inspection should be limited to sources where there is a minimum potential for malfunction or excess emissions at abnormal conditions. It also may be used periodically in connection with more complex inspection levels to ensure continuing compliance with visible emission requirements. Examples of sources to which this level of inspection can be applied are gas- and oil-fired boilers, tenter frames, incinerators, or fugitive emission sources such as conveyor transfer points and truck loadout facilities.

Level 2--

Level 2 is considered a selective type of inspection in which control device and process operating conditions are recorded as part of the source evaluation in addition to visible emission observations. This level of inspection, however, does not include the measurement of operating conditions by the inspector or the completion of a detailed engineering analysis. In a typical application, the inspector would record such process items as feed rates, temperatures, raw material compositions, process rates, and such control equipment performance parameters as water flow rates, water pressure, static pressure drop, ESP power levels, etc. The inspector would then use these values to determine any significant change since the last inspection or any process operations outside normal or permitted conditions. A significant change in operating conditions could require that the inspector upgrade the inspection to a Level 3 or that a stack test be conducted to verify compliance.

Level 3--

Level 3, the most thorough and time consuming inspection, is designed to provide a detailed engineering analysis of source compliance by use of measured operating parameters. This inspection requires the measurement of such control equipment operating parameters as pressure drop, fan static pressure and current, gas stream temperature, ESP power levels, flue gas conditions, oxygen level, and water flow rates. The measured data are reduced and used to calculate flue gas volume, superficial velocity, specific collection area, inlet velocity, air-to-cloth ratio, hood inlet volume and velocity, liquid-to-gas ratio, throat velocity, etc. Because many of these parameters are control device and source specific, they must be adjusted to the individual source being inspected. The two major purposes of this type of inspection are 1) to determine if the source is operating within accepted design conditions for the specific control device, and 2) to determine if the source is experiencing O&M problems that result in less than continuing compliance with the emission standards. The inspection also may include an internal inspection of the control device. For fabric filters, an internal inspection is required to determine bag condition or integrity of the baghouse. For scrubbers, an inspection of the condition of the nozzles is required if the water flow rate or pressure data indicate the possibility of pluggage. An internal inspection of ESP's may be required if power data indicate a problem with ash buildup or plate alignment. A periodic internal inspection of mechanical collectors is required where the collection of abrasive dust is likely to cause abrasion-induced failure. Because this level of inspection requires the monitoring of equipment conditions and, in some cases, an internal inspection, the inspector must be sure that all safety requirements are met prior to entry. In all cases, lockout procedures should be used and applicable safety equipment employed.

Level 4--

The Level 4 inspection is the preparation of a baseline for the source through the use of a stack test. This inspection requires that the inspector monitor all process and control device operating parameters during a stack test for use during future Level 3 inspections. The inspection ensures that the stack test results are representative. The Level 4 inspection is typically applied to sources with ESP's or high-energy wet scrubbers. The inspection may require documentation of control equipment conditions through the use of an internal inspection before the stack test or a chemical analysis of process material or fuel that is being burned (e.g., percent sulfur, percent ash, heat content, percent moisture).

The purpose of the increasing level of inspection is to concentrate the resources on those sources that have the greatest potential to exceed the emission limits. Initial results of the Level 3 inspection may indicate that specific sources are not experiencing deficiencies in performance and therefore do not warrant a higher level of inspection. In these cases, the frequency or level of inspection may be adjusted downward consistent with the results of the Level 3 inspection.

3.3.2 Development of the Targeting Plan

The following is a brief description of the procedures that were used to develop the targeting plan. The plan considered the type of control equipment currently installed at each source, the type of source, the source size, the geographic location, and the operating history of the source.

Control Equipment Type--

Because of the high failure rate for fabric filters installed on high temperature processes that emit abrasive dust and sulfur trioxide, sources with fabric filters operating with these conditions were initially targeted for a Level 3 inspection.

Because ESP's typically experience failures that can reduce performance, all Class A sources with ESP's were initially targeted for a Level 3 inspection. In cases where detailed compliance histories were not available for sources with ESP's, Level 4 inspections were recommended.

The most common failure mechanism in scrubbers is lack of water flow or reduced energy. Both of these failures generally result in an increase in opacity from the source. Because of the interference of condensed water vapor in the plume, accurate opacity observations are difficult to obtain. For this reason, a more detailed level of inspection is needed. Therefore, all wet scrubbers (particularly high energy venturi scrubbers) were initially targeted for a Level 3 inspection.

Type of Source--

Both the abrassiveness and grain loading of dust and the gas stream temperature have an effect on control equipment performance. Shot blasting, coal-fired boilers, asphalt plants, lime kilns, and cement kilns are high temperature sources that emit significant amounts of abrasive dust. As a result, these types of sources were initially targeted for a Level 3 inspection.

Source Size--

As the size of the individual source increases both in terms of gas volume and production, the potential uncontrolled emission rate also increases. As a result, any major malfunction at these sources can have a potentially significant impact on air quality. Therefore, sources with gas volumes in excess of 10,000 acfm were initially targeted for a Level 3 inspection.

Geographic Location--

Those sources with gas volumes greater than 1000 acfm and located in urban areas were also targeted for Level 3 inspections because of the potential impact on the population in the immediate area of the source.

Previous History (Frequency of Malfunction)--

Sources with previous history of malfunctions or improper operation were initially targeted for a Level 3 inspection because Level 3 inspections should help to identify the potential causes of the repeated malfunctions.

3.3.3 Refinement of Initial Targeting Plan

As a result of initial screening of the sources using the factors set forth in Section 3.3.1, approximately 80 percent of the sources were targeted for a Level 3 inspection. Because of the manpower constraints within Region II, Level 3 inspections could not be accomplished for all these sources within a reasonable time frame.

Because of the limited resources, the initial targeting plan was modified. The modified targeting plan called for a Level 2 inspection three times a year and a Level 3 once per year. The Level 3 inspection permitted an annual review of the overall operating procedures of the source, the internal control equipment condition, type of fuel being burned, gas flow changes, and overall plant maintenance. The Level 2 inspection premitted the inspector to acquire data on selected key operating parameters (using plant instruments) that could be compared to the data obtained during the Level 3 inspection. This modification to the targeting plan reduced the required number of Level 3 inspections by 65 to 70 percent.

3.3.4 Targeting Recommendations

As noted earlier, a targeting plan was developed for all the Class A sources located in Region II, based on a review of the inspection and permit files and discussions with each inspector. Figure 2 is an example of the form that was used to summarize the pertinent information on each Class A source resulting from the file review and discussion with each inspector.

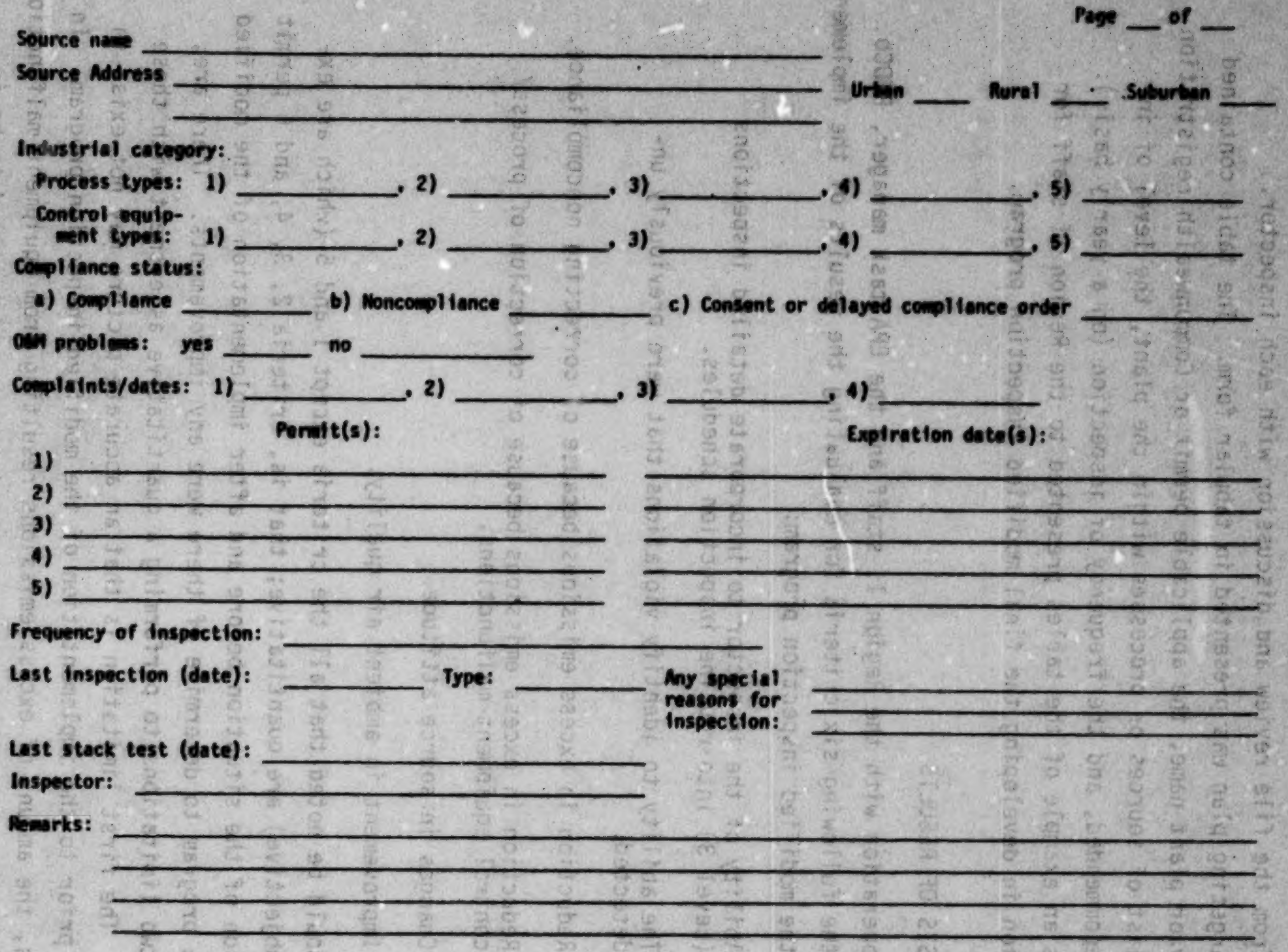
The targeting plan was presented in tabular form. The table contained the company or plant name, the applicable permit or Commonwealth registration number, a list of sources or processes within the plant, the level of inspection recommended, and the frequency of inspection (on a yearly basis). Figure 3 is an example of the tables presented to the Region II staff for consideration in developing the final modified inspection program.

3.4 ANALYSIS OF RESULTS

In cooperation with the Region II staff and the EPA task manager, PEDCo developed the following six criteria for evaluating the results of the implementation of the modified inspection program:

1. Ability of the inspector to incorporate detailed inspections (Level 3) into routine inspection schedules.
2. The ability to identify violations that were previously undetected.
3. Reduction in excess emissions because of correcting noncompliance.
4. Reduction in excess emissions because of correction of process/control equipment malfunctions.
5. Changes in source attitude.
6. Improvement in ambient air quality.

It should be noted that all the criteria except 1 and 5 (which are extremely subjective) are quantitative; that is, Criteria 2, 3, 4, and 6 permit a comparison of the situation before and after implementation of the modified inspection program to determine if there were any improvements. There are, however, two limitations to performing a quantitative assessment with these criteria. The first limitation is that an accurate picture may not exist in all cases prior to the implementation of the modified inspection program. In many cases, the amount of excess emissions resulting from equipment malfunctions or process upsets is not known because the source was determined to be in compliance and therefore (theoretically) there were no excess emissions. In



Page ___ of ___

Source name ____________________

Source Address ____________________ **Urban** ____ **Rural** ____ **Suburban** ____

____

Industrial category:

Process types: 1) ________, 2) ________, 3) ________, 4) ________, 5) ________

Control equipment types: 1) ________, 2) ________, 3) ________, 4) ________, 5) ________

Compliance status:

a) **Compliance** ________ b) **Noncompliance** ________ c) **Consent or delayed compliance order** ________

O&M problems: yes ______ no ________

Complaints/dates: 1) ________, 2) ________, 3) ________, 4) ________

Permit(s):	**Expiration date(s):**
1) ____________________	____________________
2) ____________________	____________________
3) ____________________	____________________
4) ____________________	____________________
5) ____________________	____________________

Frequency of inspection: ____________________

Last inspection (date): ________ **Type:** ________ **Any special reasons for inspection:** ____________________

Last stack test (date): ____________________

Inspector: ____________________

Remarks: ____________________

Figure 2. Example of form used to summarize information obtained from file review and discussions with inspectors.

TABLE H-1. TARGETING PLAN FOR REGION II

Company	No.	Sources	Inspection Level	Inspection Frequency/yr
Adams Construction	20032		3 2	1 1
Catawba Hospital	20590		3 2	1 (T)[a] 3
General Electric	20592	Painting	0	1
		Boiler (2)	1	1
		Grit blast	3 2	1 3
		Shot blast	3 2	1 2
		Bake oven	0	1
Koppers	20544	Creosote	1	2
		Wood boiler	3 2	1 3
		Boiler (2)	1	1
		Sawing	2	2
Marathon Oil	20995		0	1
Mohawk Rubber	20123	Boiler (3)	1	2
		Mixer	3 2	1 2
		Buffer	3 2	1 2
General Shale	20529	Kiln	1	2
		Screening	3 2	1 2
		Crushing	1	2
Old Virginia Brick		Sand drying	3 2	1 3
		Kiln (2)	1	2
		Predryer (2)	1	1
		Grinding	3 2	1 3

(continued)

Figure 3. Example of targeting plan tables.

other cases, the source may have been out of compliance, but no estimates were made regarding the amount of the excess emissions. The second limitation is that ambient air quality can be affected by several factors besides the amount of emissions. Also, unless the monitoring site is located in proximity to a source, it is extremely difficult to determine the impact of a given source on the monitoring site without using air quality dispersion modeling.

Information used in this evaluation was obtained in two ways. The first method was to obtain copies of the inspection reports and evaluations or summaries of these reports during implementation of the modified inspection plan. These reports contained information on sources, types of problems that may have been uncovered, and the action taken or planned to correct any problems or deficiencies.

The second method of obtaining information was to conduct comprehensive interviews with the five inspectors, four of them in person and one over the telephone. Figure 4 is a copy of the interview form. The Regional Director also was interviewed to obtain his input and overall perspective on the implementation of the modified inspection program and its impact on the plants located in Region II. The interview focused on how well he thought his inspectors were implementing the program, the resources that were involved, how the sources were receiving the results of the modified inspection program, and whether the cooperation with plants had increased or decreased with the use of the modified inspection program.

Name: ____________________ **Position:** ____________________

Education: ____________________________________ **Degree**

____________________________________ **Institution**

Experience: ____________________________________

____

____

1. Have you tried to implement Level 3 type inspections?

2. Approximately how many Level 3 inspections have you conducted?

3. Have the technical data obtained during the inspections been useful?

4. Do you believe that more violations of emission standards are determined as a result of Level 3 inspections (as opposed to Level 1 inspections)?

5. Has the time required for a Level 3 inspection decreased as you have gained more experience?

6. What is the average time required for a Level 3 inspection?

7. Has the modified inspection technique allowed you to improve your professional relationship with your sources?

8. Has the program allowed you to improve your professional talents and job performance?

Figure 4. Inspector Interview Form.

9. Have you encountered any problems in applying Level 3 inspections? If so, what were they?

10. Based on your experience, what has been industry's attitude toward implementing the Level 3 inspections?

11. Based on your experience, have a significant number of O&M-related problems been identified?

12. What percentage of sources that you have inspected have O&M problems?

13. Have you been able to get O&M problems corrected without issuing a notice of violation or delayed compliance order?

14. In your own words, how do you feel about the modified inspection program?

Figure 4. Inspector Interview Form. (continued)

SECTION 4

RESULTS

This section discusses the targeting or modified inspection plan, the Region II staff inspections conducted to date, and the results of these inspections. It also includes discussions regarding the attitude of the inspectors and industry toward the modified inspection plan instituted in Region II and toward Region II's overall approach to continuing compliance. The final discussion in the section concerns the impact of the modified inspection plan on resources, air quality, and emissions.

The basic approach taken in this study was to provide the necessary classroom and field training and targeting plan to the Region II staff. They in turn were to develop their own inspection plan and implement it according to their own schedule and available resources. Once the modified inspection plan was developed, PEDCo had minimal contact with the Region II staff. The contacts were kept to a minimum to enable the Region II staff to implement what they had learned without additional formal advice and consultation. The intent of this "hands-off" approach during the implementation phase was to avoid biasing the results and to simulate typical implementation of a continuing compliance program given the current constraints, mitigating circumstances, and limitations faced by many State and local control agencies.

4.1 TARGETING/MODIFIED INSPECTION PLAN

As noted in Section 3.3, a targeting plan was developed for all the Class A sources (i.e., companies) located in Region II, based on a review of the inspection and permit files and discussions with each inspector. Appendix H is the recommended targeting plan supplied to the Region II Director for his review and comment.

On August 20, 1982, after he had reviewed and evaluated the recommended plan, the Region II Director developed and issued a revised plan for inspecting the Class A sources in Region II. This plan was updated and reissued on

October 22, 1982 (Table 3). The revised plan uses the five levels of inspections described in Section 3.3. The listing of companies is the same as that contained in the CDS output of point sources. All the sources actually emit 25 tons/yr or more of particulate matter, sulfur dioxide, carbon monoxide, nitrogen dioxide, or volatile organic compounds or 5 tons/yr or more of lead; are affected by NESHAPS; or are listed in Appendix C of 40 CFR 51.

The Commonwealth's targeting plan indicated that they would not conduct a Level 3 inspection of any source with uncontrolled emissions of less than 25 tons/yr or a Level 2 inspection of any source with uncontrolled emissions of less than 5 tons/yr at normal operation unless that source emitted lead or hazardous air pollutants. The Commonwealth's plan also indicated that many Level 1 inspections would not require contact with the plant unless the opacity exceeded 20 percent. Level 1 inspections used the procedures set forth in EPA Method 9.

The plan calls for Level 2 inspections to be conducted annually for all point sources. Level 1 inspections also will be conducted at the same time, as appropriate. Any source that lacks the necessary instrumentation to conduct a Level 2 inspection should be encouraged to install that instrumentation or the Region II inspector should conduct a Level 3 inspection.

The Region II inspection plan called for Level 3 inspections of one or more of the processes or emission points at 60 sources (companies), which are listed in Table 3. The Region II staff also conducted a Level 3 inspection at the Virginia Foundry in Roanoke, although this company was not listed.

4.2 INSPECTIONS CONDUCTED

Over the last several months, the Region II staff has been implementing the modified inspection plan. To date, they have conducted Level 3 inspections at 36 companies involving more than 60 processes or pieces of control equipment.

Several factors, however, have influenced the number and levels of modified inspections that have been conducted thus far by Region II personnel. The Regional Director has adjusted the number of inspections each inspector is required to conduct from that called for in the original plan (Table 3) to account for a number of resource constraints and special circumstances associated with the individual inspectors within the Region.

TABLE 3. REGION II MODIFIED INSPECTION PLAN

Inspector identification number	County	Company	Number[a]	Sources	Inspection Level	Inspection Frequency
5	Botetourt	Adams Construction	20036	Plant	2	1
					3	1
		Blue Ridge Stone	20269	Crushers and screens	2	2
				Baghouse	2	1
					3	1
				Handling and storage	1	2
		James River Limestone Plant No. 1	20458	Crushers and screens	2	2
				Baghouses	2	1
					3	1
				Handling and storage	1	2
				Scrubbers	2	2
		James River Limestone Plant No. 2	20320	Crushers and screens	2	2
				Baghouses	2	1
					3	1
				Scrubber	2	2
				Handling and storage	1	2
		James River Limestone Plant No. 3	20569	Plant	2	1
		Weblite	20340	Sintering machine	2	4
				Baghouse	2	3
					3	1
				Crushers and screens	1	2
					2	2
				Handling and storage	1	4
		Webster Brick	20447	Kiln	2	1
				Crushing and handling	1	1

(continued)

TABLE 3 (continued)

Inspector identification number	County	Company	Number[a]	Sources	Inspection Level	Inspection Frequency
	Allegheny and Bath	C&O R.R.	20576	Plant	1	2
					2	1
					3	1
		Covington Asphalt	20119	Plant	2	2
		Pantasote	20391	Boilers	1	1
				Process	2	1
		VEPCO	20675	Plant	2	1
		Westvaco[b]	20328	Boilers	1	6
					2	3
					3	3
				Lime kiln	1	6
					2	3
					3	3
				Calciner	1	2
					2	2
					3	2
				Recovery boiler	1	6
					2	3
					3	3
				Slakers	2	4
				Smelt tanks	2	4
				Blow tanks	2	2
				Accumulators		
		Westvaco[b]	20329	Activation kilns and scrubbers	1	6
					2	5
					3	1

(continued)

TABLE 3 (continued)

Inspector identification number	County	Company	Number^a	Sources	Inspection Level	Inspection Frequency
				Powdered carbon	1	3
				Baghouses	2	2
					3	1
				Granular carbon	1	3
				Emission controls	2	2
					3	1
		Va. Hot Springs	20828	Boilers	1	1
					2	1
					3	1
	Rockbridge	Adams Construction	20037	Plant	2	1
		C. W. Barger (quarry)	20116	Plant	2	1
		Burlington Industries	20269	Coal boiler	1	2
					2	1
					3	1
				Tenter frames and dryers	1	4
		General Shale	20529	Kiln	2	1
				Sand texturizing	1	1
					3	1
		Georgia Bonded Fiber	20342	Boilers	1	4
					2	1
		Hermetite	20077	Boiler	2	1
		Lone Jack Asphalt	20021	Plant	2	2
		Lone Jack Quarry	20471	Crushers and screens	2	2
				Handling and storage	1	2
				Baghouse	2/3	1/1

(continued)

TABLE 3 (continued)

Inspector identification number	County	Company	Number[a]	Sources	Inspection	
					Level	Frequency
		REA Magnet Wire	20655	Plant	2	1
					1	1
		Reeves Bros.	20516	Boilers	1	1
				Curing oven	1	1
					2	1
		Taylor Ramsey	20438	Boiler	1	2
					2	1
					3	1
				Process	1	1
					2	1
3	Botetourt	Lone Star Cement	20232	Kilns, raw mill, and clinker cooler	1	6
					2	3
					3	3
				Miscellaneous sources	1	3
				Baghouses	2	2
					3	1
	Montgomery	Adams Construction	20484	Crushers and screens	2	2
				Handling and storage	1	2
		Adams Construction	20914	Plant	2	1
					3	1
		Blacksburg/VPI Incinerator	20911	Incinerator	2	1
		Cupp Black Top	20022	Plant	2	1
					3	1
		Radford Limestone Plant No. 3	20434	Crushers and screens	2	2
				Handling and storage	1	2

(continued)

TABLE 3 (continued)

Inspector identification number	County	Company	Number[a]	Sources	Inspection	
					Level	Frequency
		Radford Limestone Ironto Plant	20433	Crushers and screens	2	2
				Handling and storage	1	2
		Sisson & Ryan Asphalt	20796	Plant	2	1
					3	1
		Sisson & Ryan Quarry	20797	Crushers and screens	2	2
				Handling and storage	1	2
	Pulaski	Bond Cote	20526	Plant	2	1
		Burlington Industries	20271	Boiler (coal)	1	8
					2	3
					3	1
				Tenter frames	1	1
					2	1
		Coleman Furniture	20300	Wood boiler	1	4
					2	1
					3	1
				Cyclones	1	4
					2	2
				Finishing	1	2
		Gallimore Paving	20735	Plant	1	2
					2	1
					3	1
		Hercules	20322	Plant	1	2
					2	1
					3	1
		Hoover Color	20321	Boiler	1	2
				Process	2	3
					3	1

(continued)

TABLE 3 (continued)

Inspector identification number	County	Company	Number[a]	Sources	Inspection	
					Level	Frequency
		Pulaski Furniture Pulaski	20470	Boiler	1	4
					2	1
					3	1
				Cyclones	1	4
					2	2
				Finishing	1	2
		Pulaski Furniture Dublin	20789	Boilers	1	4
					2	1
					3	1
				Woodworking	2	1
					3	1
				Finishing	1	2
		Radford Limestone Plant No. 1	20431	Crushers and screens	2	2
				Handling and storage	1	2
		Radford Limestone Plant No. 2	20432	Crushers and screens	2	2
				Handling and storage	1	2
		Volvo-White Motors	20765	Plant	2	1
	c	Draper Paving	20035	Plant	2	1
					3	1
		Exxon	20991	Storage tanks	2	1
		Harris Hardwood	20451	Boilers	1	2
					2	1
					3	1
				Cyclones	1	2
					2	2

(continued)

TABLE 3 (continued)

Inspector identification number	County	Company	Number[a]	Sources	Inspection	
					Level	Frequency
		Hooker Furniture	20523	Boiler and woodworking	1	2
					2	1
					3	1
				Finishing	1	2
		Mennel Milling	20711	Plant	1	1
					2	1
		N&W R.R.	20468	Boilers	1	8
					2	2
					3	2
				Processes	1	4
					2	1
					3	1
		Reliance Universal	20469	Plant	2	1
		Roanoke Electric Steel	20131	Furnaces	1	6
					2	4
					3	2
				Other	1	1
					2	1
		Rockydale Quarry	20456	Crushers and screens	1	2
					2	4
				Baghouses	1	2
					2	3
					3	1
				Handling and storage	1	6
		Singer Furniture	20212	Boiler and baghouse	1	2
					2	1
					3	1

(continued)

TABLE 3 (continued)

Inspector identification number	County	Company	Number[a]	Sources	Inspection Level	Inspection Frequency
1	Radford			Cyclones	1	2
					2	2
				Finishing	1	2
		Virginia Asphalt	20031	Plant	2	1
					3	1
		Walker Foundry	20034	Plant	2	2
		Lynchburg Foundry	20381	Baghouses (cupolas)	1	3
					2	2
					3	1
				Baghouses (other)	1	1
					2	2
					3	1
				Scrubbers	1	3
					2	2
					3	1
		Radford Arsenal	20656	Powerhouse No. 1	1	1
					2	2
					3	1
				Powerhouse No. 2	1	2
					2	1
					3	1
				Process and incinerator	1	1
					2	1
2	Augusta	American Safety Razor	20189	Boilers	1	1
				Process	2	1
		Crompton Shenandoah	20413	Boilers	1	1
				Process	2	1

(continued)

TABLE 3 (continued)

Inspector identification number	County	Company	Number[a]	Sources	Inspection	
					Level	Frequency
		DuPont	20517	Boilers (coal)	1	2
					2	1
					3	1
				Boilers (oil)	1	1
				Orlon plant	1	3
				Nylon plant	1	1
					2	1
		Luck Stone	20565	Crushers and screens	2	2
				Baghouse	2	1
					3	1
				Handling and storage	1	2
		Moffett Paving	20025	Plant	2	1
					3	1
		Moore Bros. Asphalt	20027	Plant	2	1
					3	1
		Reynolds Metals	20515	Coal boilers	1	1
					2	1
					3	1
				Oil boilers	1	1
				Processes	1	1
					2	1
		Stanley Furniture	20480	Boilers (wood)	1	2
					2	1
					3	1
				Finishing	1	2
				Dust system	1	1
					2	1
		Staunton Limestone	20794	Crushers and screens	2	2
				Baghouse	2	1
					3	1
				Handling and storage	1	2

(continued)

TABLE 3 (continued)

Inspector identification number	County	Company	Number[a]	Sources	Inspection Level	Inspection Frequency
		Va. Metalcrafters	20518	Baghouse	2	1
					3	1
		M. A. Layman (Valley Paving)	20026	Plant	2	1
					3	1
		Belmont Trap Rock	20206	Crushers and screens	2	2
				Handling and storage	1	2
		Wayn-Tex	20337	Boilers	1	1
				Process	2	1
		Dept. of Corrections	20412	Boilers	1	1
					2	1
					3	1
	Rockingham	Blakemore Construction	20039	Plant	2	1
					3	1
		Elkton Limestone	20018	Crushers and screens	2	2
				Baghouses	2	1
					3	1
				Handling and storage	1	2
		Ethan Allen	20548	Boiler	1	1
					2	1
					3	1
				Dust system	1	1
					2	1
				Finishing	1	2
		Frazier Quarry	20005	Crushers and screens	2	2
				Baghouse	2	1
					3	1
				Handling and storage	1	2

(continued)

TABLE 3 (continued)

Inspector identification number	County	Company	Number[a]	Sources	Inspection	
					Level	Frequency
		Frazier Quarry	20919	Crushers and screens	2	2
				Baghouse	2	1
					3	1
				Handling and storage	1	2
		A. N. Johnston	20972	Plant	2	1
					3	1
		M. A. Layman	20038	Plant	2	1
					3	1
		JMU	20117	Boilers	2	1
		Merck & Co.	20524	Coal boilers	1	1
					2	1
					3	1
				Incinerators	1	1
					2	1
					3	1
				Processes	2	2
		C. S. Mundy	20208	Crushers and screens	2	2
				Baghouse	2	1
					3	1
				Handling and storage	1	2
		Quality Feeds	20771	Boilers	1	1
				Process	2	1
		ROCCO	20087	Boilers	1	1
				Process	2	2
		Rockingham Milling	20513	Boiler	1	1
				Process	2	1

(continued)

TABLE 3 (continued)

Inspector identification number	County	Company	Number[a]	Sources	Inspection Level	Inspection Frequency
		Rockingham Poultry	20786	Boilers	1	1
				Process	2	1
		Wampler Foods	20553	Boilers	1	1
				Process	2	1
		West Sand & Gravel	20982	Crushers and screens	2	2
				Handling and storage	1	2
4	Giles, Blacksburg, and Christiansburg	Adams Construction	20033	Plant	2	1
					3	1
		APCO	20460	Plant	1	6
					2	3
					3	3
		Celanese	20304	Boilers (coal)	1	2
					2	2
					3	2
				Gas/oil boiler	1	1
				Scrubbers	1	1
					2	1
				Baghouses	1	1
				Carbon adsorbers	2	2
		National Gypsum (Gold Bond)	20225	Kilns	1	6
					2	4
					3	2
				Other processes, Handling and storage	1	3
					2	2
					3	1

(continued)

TABLE 3 (continued)

Inspector identification number	County	Company	Number[a]	Sources	Inspection Level	Inspection Frequency
		Virginia Lime	20341	Kilns	1	3
					2	2
					3	1
				Other processes	1	3
				Handling and storage	2	3
		VPI & SU	20124	Boiler No. 6 and No. 7	1	4
					2	1
					3	1
				Gas/oil boilers	1	1
		Wolverine	20763	Boiler	1	1
				Incinerator	2	1

[a] Commonwealth Registration Number.

[b] Responsibility for these sources may be delegated to Bob Saunders.

[c] City of Roanoke.

The distribution of inspections was adjusted according to the number and types of sources operating at each facility. Currently, 95 inspections are being conducted annually by the 5 inspectors in Region II (2 by Inspector 1, 30 by Inspector 2, 32 by Inspector 3, 7 by Inspector 4, and 24 by Inspector 5).

4.2.1 Summary of Inspections

Over the period of the study, several facilities in Region II have either ceased operation or have severely restricted their operating hours as a result of the economic recession. This has resulted in a day-to-day adjustment in the number and frequency of scheduled inspections. Although the overall impact of economic conditions on the pilot study cannot be assessed at this time, the initial impact has been a reduction in the number of inspections made during the initial study period. Although the original time frame for completing the study was extended to increase the number of inspections, a large number of facilities have yet to be inspected under the modified inspection plan.

To date, approximately 68 of the processes or emission points have been inspected (i.e., about 37% of the companies). Table 4 summarizes the results of these inspections. Because many of the sources were promised anonymity in terms of identifying problems for the purposes the pilot study report, the sources are listed only by an arbitrarily assigned identification code.

4.2.2 Analysis of Inspections

The Regional Director required the inspectors to document the results of each Level 3 inspection conducted during the study period. The documentation was in the form of a narrative report that identified the sources inspected and any deficiencies noted in each operation and its associated control equipment. Appendix I is an example of the inspection reports that have been prepared as a result of implementing the modified inspection program. PEDCo reviewed these inspection reports and interviewed each inspector concerning details of the inspection. Over the study period no Level 4 inspections were conducted, but several are expected to take place as a result of information obtained during Level 3 inspections.

TABLE 4. RESULTS OF VIRGINIA PILOT STUDY - LEVEL 3 INSPECTIONS

Source ID	Source type	Control device[a]	Problems identifiable by inspection level		Compliance		Problem		Action taken			
			1	3	In	Out	Unknown	O&M	Corrected with agreement	NOV[b]	CO[c]	Other
A	Crushing/ screening	FF		x	x			x	x			
B	Crushing/ screening	FF		x	x			x	x			
	Handling/ storage	WS			x							
C	Sintering	FF		x	x			x	x			
D	Asphalt	WS		x[e]		x[d,e]						
E	Recovery boiler	ESP			x							
	Lime kiln	VS			x							
	Power boiler	ESP			x							
	Carbon	VS	x[d]			x[d]						x
F	Boiler	MC			x							
G	Kilns 1-4	ESP	x[d]	x[e]		x[d,e]		x	x[f]			
	Raw mill	ESP	x[d]	x[e]		x[d,e]		x	x[g]			
	Clinker cooler	FF		x		x[e]		x	x[f]			

(continued)

TABLE 4 (continued)

Source ID	Source type	Control device[a]	Problems identifiable by inspection level		Compliance		Problem		Action taken			
			1	3	In	Out	Unknown	O&M	Corrected with agreement	NOV[b]	CO[c]	Other
	Kiln 5	ESP			x							
	Silo	FF			x			x	x			
	Fringe clinker	-		x		x^e						Install silos
	Finish mills	FF		x		x^e		x				
H	Asphalt	FF	x^d	x		x^d		x	x			
I	Boiler	MC	x^d	x		x^d		x	x			
J	Wood boiler	MC			f		x					
K	Asphalt	VS	x^d			x^d		x	x			Install FF
L	Mill no. 1	FF		x	x			x	x			
	Mill no. 2	FF		x	x			x	x			
	Mill no. 3	FF		x		$x^{d,e}$		x	x			
	Calciner	FF		x				x	x			
M	Boiler	MC			x							
	Woodworking	FF			x							

(continued)

TABLE 4 (continued)

Source ID	Source type	Control device[a]	Problems identifiable by inspection level		Compliance		Problem		Action taken			
			1	3	In	Out	Unknown	O&M	Corrected with agreement	NOV[b]	CO[c]	Other
N	Boiler	MC	x[d]	x		x[d]		x	x			
O	Asphalt	FF		x		x[e]		x	x[f]			
P	Boiler	MC			x							ESP to be installed in 1984
	Shotblast	FF	x[d]	x[e]		x[d,e]		x	x			Replace with new FF
	Foundry	WS	x[d]	x[e]		x[d,e]		x	x			Replace with FF
Q	Steel - EAF[i] no. 2, 3	FF		x		x[e]		x	[h]	x		
	EAF no. 4	MC FF	x[d]	x		x[d]		x	x	x		
R	Quarry - Fines mill	FF		x	x			x	x			
	New fines mill	FF		x	x			x	x			
S	Boiler	MC		x	x			x	x			
	Woodworking	FF		x	x			x	x			

(continued)

TABLE 4 (continued)

Source ID	Source type	Control device[a]	Problems identifiable by inspection level		Compliance		Problem		Action taken			
			1	3	In	Out	Unknown	O&M	Corrected with agreement	NOV[b]	CO[c]	Other
T	Asphalt	WS		x	x			x	x			
U	Medium cast facility	WS	x[d]	x		x[d]		x	x			
	EAF	FF		x	x			x	x			
	Cupola	FF		x	x			x	x			Replace with new FF
	Shakeout	FF		x	x			x	x			
	Sand shakeout	FF		x	x			x	x			
	Shot handling	FF		x	x			x	x			Replace with new FF
	Shot blasting	FF		x	x			x	x			Replace with new FF
	Sand reclaim	FF		x		x[e]		x	x			Replace with new FF
V	Boiler no. 1	MC		x	x			x	x			
	Boiler no. 2	ESP			x							

(continued)

TABLE 4 (continued)

Source ID	Source type	Control device[a]	Problems identifiable by inspection level		Compliance		Problem		Action taken			
			1	3	In	Out	Unknown	O&M	Corrected with agreement	NOV[b]	CO[c]	Other
W	Boiler	FF			x							
X	Crushing	FF			x							
Y	Asphalt	FF			x							
Z	Boilers	MC	x[d]	x[e]		x[d,e]		x	x			
	Woodworking	FF			x							
AA	Asphalt	FF		x	x			x	x			
BB	Institutional boiler	MC		x	x			x	x			Poor operation of proposing FF
CC	Boiler	MC			x							
	Woodworking	FF		x	x			x	x			
DD	Boilers	MC			x							
EE	Power generation boiler no. 5	ESP	x[d]	x[e]		x[d,e]		x	x			Reduced operating rates

(continued)

TABLE 4 (continued)

Source ID	Source type	Control device[a]	Problems identifiable by inspection level		Compliance		Problem		Action taken			
			1	3	In	Out	Unknown	O&M	Corrected with agreement	NOV[b]	CO[c]	Other
	Boiler no. 6	ESP			x							
FF	Boiler	ESP		x	x							
GG	Kiln	FF	x^{d}	x^{e}		$x^{d,e}$		x	x			
	Kiln	Gravel bed filter		x	x			x	x			
HH	Kiln	WS			x							
II	Institutional boiler	MC		x		x^{e}		x	x			
JJ	Cupola	FF	x^{d}	x^{e}		$x^{d,e}$		x			x	
	Brass smelter	FF		x		x^{e}		x	x			

[a] FF = fabric filter.
ESP = electrostatic precipitator.
WS = wet scrubber.
VS = Venturi scrubber.
MC = multicyclone.

[b] NOV = Notice of Violation.

[c] CO = Compliance Order.

[d] VE limit.

[e] Particulate emission limit.

[f] Part corrected, part being corrected.

[g] In process of being corrected.

[h] Unknown - obtaining additional information.

[i] EAF = Electric Arc Furnace.

In summary, 36 companies (68 individual processes or emission points) received Level 3 inspections. Under the modified targeting plan, many sources were inspected more than once during the study period. To date, Level 3 inspections have been conducted at approximately 60 percent of the companies for which such inspections were required.

An initial review of the Region II files, registration list, CDS output, and inspector interviews conducted at the beginning of the study indicated that no sources were in violation of regulations limiting particulate or visible emissions. One source, however, was identified as having been granted a variance from the Air Pollution Control Board to operate at an opacity of 50 percent as long as it met the particulate emission standard. Granting of this variance was based on the information submitted by the company that it was not technically or economically feasible for them to comply with the opacity standard of 20 percent.

Prior to the initiation of the study, Region II was using a combination of Level 1 and Level 2 inspection techniques to determine compliance. The inspectors made no measurements and no internal inspections were conducted on control equipment to certify compliance or operating conditions.

Under the modified inspection program, the inspector uses a number of parameters extending beyond visible emissions to determine compliance. A significant increase in particulate emissions can often occur as a result of equipment malfunction without an accompanying increase in observed opacity. Using engineering judgment, equipment design data, and equipment performance measurements, the inspector was able to determine compliance with the applicable particulate matter emission limitation.

As a result of the more detailed inspection of the control device, the inspector was also able to determine the cause of the noncompliance condition. If a problem was identified, a judgment was made concerning the cause of the problem (i.e., O&M- or design-related, Table 4).

In many cases, problems were identified that were not serious enough to result in noncompliance but which generated emission levels above those considered achievable according to the design capabilities of the collector.

The 68 Level 3 inspections of individual processes or emission units identified 25 sources (37%) as being out of compliance with either visible or particulate emission standards (28% visible emission standard, 32%

particulate emission standard, 40% both). Of the total number of processes or emission units inspected, 46 (67%) were identified as having O&M-related problems (Table 5).

TABLE 5. SUMMARY OF INSPECTIONS USING LEVEL 3 METHODS

	Number	Percent
Plants where Level 3 inspections were required	61	-
Plants where Level 3 inspections were conducted	36	59[a]
Sources where Level 3 inspections were required	96	-
Sources where Level 3 inspections were conducted	68	70[a]
Plants out of compliance	17	47[b]
Sources out of compliance	25	36[b]
Visible standard	7	28[b]
Particulate standard	8	32[b]
Both	10	40[b]
Sources with O&M problems	46	67[b]

[a] Percent of total called for in modified inspection plan.

[b] Percent inspected.

It should be pointed out that of the 25 sources for which compliance problems were identified, only 12 would have been identified as a result of a Level 1 inspection (i.e., type of inspection commonly conducted prior to the study). It should also be noted that only the VE portion of the problem would have been identified as a result of a Level 1 inspection. In addition, of the 46 sources for which O&M-related problems were identified, none of the problems would have been identified through the use of a Level 1 inspection.

The policy of the Air Pollution Control Board has been to enforce air regulations in a manner that would encourage voluntary compliance with the applicable standards. The Board does have the legal and regulatory authority to impose penalities and issue orders to secure compliance with standards when voluntary compliance is not effective.

In keeping with the policy of voluntary compliance, Region II has developed a procedure for addressing deficiencies in control equipment performance discovered during Level 3 inspections. When a deficiency is determined, the source is advised of the problem and requested to take corrective action. Depending on the time requirements, one of the following actions generally occurs:

- If proposed corrections can be completed within 30 days, an informal agreement is made between the source and the Agency. The source is reinspected after 30 days to confirm that the corrective action has been taken.
- If the proposed correction will take between 30 and 90 days, the Agency issues a notice of violation and enters into a formal consent agreement.
- If the proposed corrective action will take longer than 90 days, a Board action is required, which could include a compliance order (CO).

Based on the above criteria, 45 O&M problems have been handled by informal agreement. Most of the corrections are neither capital-intensive nor require extensive downtime. In most cases, the source is able to complete the action during scheduled maintenance periods.

Two processes or emission units at source Q have required the issuance of a formal Notice of Violation (NOV) to correct operational problems that have resulted in noncompliance with emission standards.

One source was identified as having visible and particulate violations prior to the study and was issued a Board order during the study period. Data obtained during Level 3 inspections have been used to support specific corrective actions pursuant to this order.

Under Virginia regulations, an excess emission period must be judged as "unpreventable and sudden" to qualify as a malfunction. Based on the inspectors' reports, types of problems identified, and interviews with the inspectors, the problems found during Level 3 inspections would not qualify as a malfunction and are therefore classified as excess emissions that should be reduced or prevented.

4.3 ATTITUDE OF THE INSPECTOR

The attitude of the inspector is critical to the implementation of a modified inspection plan that stresses continuing compliance. Although the inspector may have the educational background and experience to implement the modified inspection plan, if he does not believe in the goals and objectives of the plan, the implementation will not be effective. Therefore, one important criterion in evaluating the effectiveness of the modified inspection plan in Region II is inspector attitude.

4.3.1 Response to Interviews

As noted in Section 3, each of the inspectors was asked a series of 14 questions. Table 6 summarizes the responses to questions 1 through 13 which lend themselves to short yes/no responses. The responses to question 14--in your own words, how do you feel about the modified inspection program?--are discussed in Section 4.3.2.

4.3.2 Analysis of Interviews

The following is an analysis of the interviews with the inspectors with regard to their acceptance of the comprehensive inspections, their personal advancement, and their relationship with the plants.

Acceptance of the Comprehensive Inspections--

Initially, some of the inspectors expressed general skepticism concerning the benefits of the modified inspection program. The areas of doubt centered around the potential for noncompliance and whether the modified inspection techniques would identify additional problems.

Over the course of the study each inspector has attempted to use the inspection equipment and to give the program a fair and unbiased trial. Two inspectors have made extensive use of the inspection equipment and techniques and have developed methods and criteria exceeding that specified in the training. Two inspectors have used portions of the training and equipment to support Level 2 inspection conclusions, but have not attempted to apply all methods in each case. One inspector still remains cautious concerning the use of these techniques but has had limited exposure to the Level 3 techniques.

Three of the inspectors expressed a concern regarding the safety of internal equipment inspections. This concern is valid, and all inspectors have followed established guidelines with respect to confined area entry. The inspectors have requested that additional instruction and information be provided regarding internal inspectors.

TABLE 6. SUMMARY OF INSPECTOR RESPONSES

Inspector	Question number												
	1[a]	2[b]	3[c]	4[d]	5[e]	6[f]	7[g]	8[h]	9[i]	10[j]	11[k]	12[l]	13[m]
1	Yes	4	Yes	Yes	No	4 h	Yes	Yes	Yes	Favorable	Yes	75%	Yes
2	Yes	2	Yes	Yes/No	Yes	2 h	Yes	Yes	None	Generally receptive	Yes	7-8%	Yes
3	Yes	13[n]	Yes	Yes	Yes	4 h	Yes	Yes	No	Generally receptive	Yes	50-75%	Yes
4	Yes	6	Definitely	No, but saved sources money	Yes	2 h	Yes	Yes	Yes 2 sources	Generally receptive	Yes	80-90%	Yes
5	Yes	3	Yes	No	No	2-3½ h	Yes	Yes	No	Cautious	No	0	N/A[o]

[a] Have you tried to implement Level 3 type inspections?

[b] Approximately how many Level 3 inspections have you conducted?

[c] Have the technical data obtained during the inspections been useful?

[d] Do you believe that more violations of emission standards are determined as a result of Level 3 inspections (as opposed to Level 1 inspections)?

[e] Has the time required for a Level 3 inspection decreased as you have gained more experience?

[f] What is the average time required for a Level 3 inspection?

[g] Has the modified inspection technique allowed you to improve your professional relationship with your sources?

[h] Has the program allowed you to improve your professional talents and job performance?

[i] Have you encountered any problems in applying Level 3 inspections? If so, what were they?

[j] Based on your experience, what has been industry's attitude toward implementing the Level 3 inspections?

[k] Based on your experience, have a significant number of O&M-related problems been identified?

[l] What percentage of sources that you have inspected have O&M problems?

[m] Have you been able to get O&M problems corrected without issuing a notice of violation or delayed compliance order?

[n] Thirteen sources, 32 individual Level 3 inspections.

[o] Not applicable; has not discovered any O&M problems.

Based on the inspectors' comments during the interviews and on written statements in their inspection reports, the more comprehensive inspection methods have been accepted and incorporated into their inspection routine. A sample of comments received are:

- "This method of inspection has produced excellent results...."
- "I feel that this equipment has greatly improved our ability to identify existing and potential problems. I have also found that most sources are very receptive to our new inspection procedures...."
- "I believe the sources have more respect for our program because we are now trained to assist in finding solutions to problems...."

The Regional Director has indicated that the inspectors can enter facilities with the confidence and expertise necessary to understand plant processes and control equipment. As a result of this study, each inspector has a better understanding of the basic functions of the control devices and operating parameters. In general, the inspectors' attitude toward inspections and industry's attitude toward the inspector have improved.

Personnel Advancement--

Each inspector agreed that the comprehensive inspection methods, access to technical information, and training have increased his personal knowledge and technical abilities. The ability to extend the scope of the inspection by using technical information has increased the inspector's awareness of his professional status and abilities. This is exemplified in his overall job performance and his general self image as a professional. As the inspectors conduct more inspections and learn from the data obtained, their ability to analyze problems will increase, along with their confidence to conduct the comprehensive inspections and analyses critical to continuing compliance.

Industry Respect--

Based on the inspector interviews and comments from industry in the area, the inspectors have gained considerable respect in the eyes of plant personnel. Although the inspector has always been viewed as qualified and fair, industry has gained a new respect for the inspector as a technically qualified person capable of discussing, understanding, and evaluating the operation of air pollution control equipment.

4.4 ATTITUDE OF INDUSTRY CONCERNING COMPREHENSIVE INSPECTIONS

The attitude of industry toward the change in inspection procedures is difficult to evaluate without a specific plant-by-plant survey. A few plants, however, have made unsolicitied favorable comments concerning the inspection activities. One letter stated, "We subscribe to the Air Pollution Control Board's program and look forward to continuing good relations." Copies of several letters that have been received from the industry in Region II regarding the implementation of the modified inspection program are included in Appendix J.

Each inspector was questioned concerning the plant's attitude with respect to the modified inspection program. One inspector indicated that industry was cautious and concerned about the potential for increased cost. Two inspectors indicated that most sources welcome the new inspection approach because of the knowledge they gain from the inspections.

It is the opinion of the Regional Director that about 50 percent of the plants see substantial benefits from the new more comprehensive inspections because of the measurements and analyses conducted by the inspectors. Also, finding the cause of failures has been extremely helpful to plant managers and operators in planning corrective action. In many cases, maintenance personnel are now assigned to the inspector so they can obtain helpful information during the course of the inspection.

Many plants do not consider this Agency/plant relationship a consultant/client relationship, but rather an added resource through which the plant can determine the proper corrective action to ensure continuing compliance. After the problems have been identified, the plant will generally seek the services of a consultant or engineering firm to plan and complete the necessary changes, if they are extensive.

The Regional Director expressed the viewpoint of most of the sources as follows "...it has also improved our relations with most industry, since they now see us more as partners in the continuing effort to ensure that their costly investments in pollution controls actually produce cleaner air..."

Only one source has indicated any open resistance to the changes in inspection procedures. This attitude appears primarily to be the result of the increased attention to certain sources that could result in extensive and costly modifications. The source is currently operating under a Board variance allowing an opacity limit of 50 percent. The increased inspection data have raised questions concerning the ability of the plant to comply with a lower opacity limit.

The Regional Director stated, "With one exception, the industries where we have used the advanced inspection techniques have been receptive. Typically, the initial reaction to the procedure is one of skepticism because they believe that their control equipment is operating as well as can be expected. Their next reaction is usually shock or embarrassment when developing problems are identified. Finally, they will express their gratitude for being shown the problem before it becomes a major concern; at this point most sources agree to repair the problem and/or improve their maintenance programs."

Appendix K is a brief summary prepared by the Region II Director on how the inspection procedures have changes for each source as a result of this study. In addition to this brief summary, the Regional Director and the Director of the Division of Compliance have prepared two letters regarding the overall results of the pilot study (Appendix L).

4.5 AGENCY APPROACH TO CONTINUING COMPLIANCE

The Commonwealth of Virginia Air Pollution Control Board has made a commitment to a program of continuing compliance for the sources within its jurisdiction. Through the use of more comprehensive inspections and increased emphasis on O&M, excess emission periods are identified and corrective action taken. Because many problems may be corrected in a short period of time, a nonpunitive approach to solving these problems has been taken. In the words of the Director of the Division of Compliance, "By emphasizing the cooperative, nonpunitive approach, we have minimized any sense by industry that they are being unduly harassed."

If the problems are extensive or the source is unwilling to make voluntary corrections, the Board may, at its discretion use legal or administrative methods to assure compliance. These methods may include NOV's, CO's, variances, and civil or criminal penalties.

4.6 RESOURCES REQUIRED TO IMPLEMENT COMPREHENSIVE INSPECTIONS

The cost of equipping an inspector with the instruments necessary to conduct Level 3 inspections is approximately $500. In Region II, two complete sets of inspection equipment were used. Because Level 3 inspections are targeted and preplanned, this equipment can be reserved and made available for each scheduled inspection.

To ensure that the inspections were conducted efficiently and to minimize the time required by industrial personnel, the Regional Director placed a 4-hour time limit on Level 3 source inspections. According to the inspectors, Level 3 inspections have taken from 2 to 4 hours, depending on complexity of the source and the number of processes or control devices involved.

The extra time required for Level 3 inspections made it necessary to reduce somewhat the total number of inspections typically conducted. With the reduction in the number of inspections from 95 to 60, greater emphasis was placed on those sources causing the most serious problems and those with the greatest potential to cause problems.

Many of the inspectors have noted that the initial Level 3 inspection at a source requires more time than subsequent followup inspections because they must locate the sampling ports and access points, and discuss the inspection with plant personnel. In subsequent inspections, both the inspector and plant maintenance personnel are aware of the measurements that must be made and proper locations for these measurements. Also, data requirements are greater during the initial Level 3 inspection than during subsequent inspections. Any design data that are not available from registration or permit files are usually obtained during the initial Level 3 inspection (i.e., the inspector must prepare a baseline for the major operating parameters). These data generally include fan model and manufacturer, fan rpm, fabric filter size, number of bags, cloth area, venturi scrubber throat area, etc. One inspector indicated that the time required for a typical Level 3 inspection was reduced by 50 percent in subsequent inspections.

Adjustments can be made in the amount of data and the time required to conduct a Level 3 inspection, depending on site-specific factors. As more Level 3 inspections are conducted, site-specific inspection forms can be developed that will further reduce data and time requirements.

4.7 IMPACT ON AIR QUALITY

The primary purpose of a continuing compliance program is to ensure that the NAAQS are attained and maintained. Therefore, the air quality levels within an area should be an indication of how well the continuing compliance program is working within that area. Several factors can affect air quality, however, and make it difficult to evaluate the impact of a continuing compliance program on air quality. One such factor is the meteorological conditions of the area. The amount of rainfall, the average windspeed, the number of days with inversions, etc., all affect the measured total suspended particulate (TSP) levels. It is often difficult to determine without extensive analyses, whether the air quality has actually improved in a given year or meteorological conditions have tended to make the concentrations lower.

Another factor is the location of the monitoring sites with respect to the major sources within an area. In some cases, the monitoring sites are selected to represent an areawide air quality picture; whereas in other cases, they are located near major point sources to obtain information on the air quality impact of the source in question. If only areawide monitors are available, detailed dispersion modeling is necessary to determine which sources may have an impact on the monitors and to what extent. Of course, impacts vary with the meteorological conditions being simulated in the air quality dispersion modeling analysis.

In general, because most of the monitors in Region II are areawide monitors, it is very difficult to assess the impact of reducing malfunctions and excess emissions without the use of detailed dispersion modeling, which was beyond the scope of this study. Therefore, the impact of the modified inspection program on air quality could not be evaluated. The air quality in Region II has improved somewhat over the last several quarters; however, without a detailed statistical evaluation of the air quality levels for the last couple of years (which again was beyond the scope of this effort) it is difficult to determine if this trend is due to the implementation of the modified inspection program.

4.8 IMPACT ON EMISSIONS

The inspectors obtained little information on the amount of excess emissions that may have been avoided because the modified inspection program was implemented. Each of the inspectors believed that previously unidentified excess emissions had been discovered and that almost all of the conditions causing these excess emissions had been corrected. Thus, in a qualitative sense, the amount and frequency of excess emissions have been reduced as a result of implementing the modified inspection program.

Appendix M of this report, however, does present two case histories of plants where the modified inspection plan provided for some real improvements in the overall operation of the source.

SECTION 5

CONCLUSIONS AND RECOMMENDATIONS

5.1 CONCLUSIONS

The following conclusions are based on the limited number of inspections that have taken place in the short time period the modified inspection program has been in use.

1. Forty-six O&M-related problems have been identified to date by using Level 3 inspection techniques. These problems would not have been identified using the Level 1 inspection techniques.
2. Most O&M problems were corrected without issuing NOV's and CO's because the sources sensed a new cooperative spirit on the part of the inspector to help identify the potential cause of the O&M problem.
3. Most O&M problems were corrected within a 30-day period because it was economically feasible for the source to correct the problem.
4. Comprehensive inspections were generally welcomed by certain sources, however, other sources were more cautious and reserved.
5. The inspectors have improved their technical abilities and professional status with industry through the implementation of comprehensive inspection techniques.
6. Inspectors were able to incorporate comprehensive inspections into their inspection schedules with only minor adjustments.
7. The data collected to date are insufficient for determining the impact of comprehensive inspections on emissions or ambient air quality. Based on the number of O&M and compliance problems corrected and the average reduction in visible emissions, a positive improvement has occurred.
8. The Region II Office was able to implement the modified inspection plan using their current resources with little outside assistance once they had received the classroom and field training instruction and had an opportunity to test the procedures on their own.

Because all of the inspections have not been completed and all sources have not been revisited, these should only be considered interim conclusions.

5.2 RECOMMENDATIONS

It is believed that the initial problems uncovered by the inspectors will be corrected and that the affected equipment will be operated properly for an undefined period of time. Because repeat inspections have not yet been made, it is not possible to assess the long-term impact of the modified inspection program. Malfunction of the equipment could continue, or new problems could occur. Only with a longer tracking period (2 to 5 years) can the long-term impact of the comprehensive program be determined. Based on the comments of the Regional Director and the Director of the Division of Compliance, the Commonwealth will continue to conduct more comprehensive inspections. With time, however, these inspections will change in scope, applicability, and frequency as problems are corrected. Based on the results of the study to date, the following recommendations are made:

1. The study should be extended for a 2-year period, during which time the inspection activities should be tracked.
2. The inspector should be required to complete an inspection summary card on each inspection (Level 1, 2, 3, etc.). This card should include, as a minimum, time on site, type of control device, measurements conducted, compliance status, nature of equipment deficiencies, and action taken. This form must be designed so that the preliminary information on each source can be entered prior to the scheduled inspection and the form can be completed in 10 minutes or less. The information on this card can be used to perform a more quantitative assessment of the impact of the modified inspection program.
3. One or two source-oriented ambient particulate monitors should be established to determine the effects of malfunctions and O&M problems on ambient air quality.
4. Additional safety manuals and instruction should be provided to the inspectors to address their safety concerns.
5. At the end of a 2-year period, a comprehensive industry survey should be conducted to determine their reaction to the program.
6. Specific detailed control equipment histories should be developed for several sources and these histories updated to determine the long-term effects of the modified inspection program.

APPENDIX A

CDS OUTPUT FOR THE VALLEY OF VIRGINIA

Reproduced from best available copy.

```
                                                 QUICK LOOK REPORT
.......................................................................

    05/20/81                                    COMPLIANCE DATA SYSTEM

                                         SPECIAL VIRGINIA REGION REPORT

.......................................................................

 STATE REG. NO.      SOURCE NAME     CNTY  SIC SIC CODE DESCRIPTION
.......................................................................

20000 COMMENT  ROCKBRIDGE CNTY SCHL 2740 0211 ELEMENTARY AND SECONDARY SCHOO
20001          DRAGON CHEMICAL CO.  2720 2879 AGRICULTURAL CHEMICALS, NEC
20004          HENKEL-HARRIS CO.INC 1220 2511 WOOD HOUSEHOLD FURNITURE
20005          FRAZIER QUARRY,INC.  2760 1422 CRUSHED AND BROKEN LIMESTONE
20018          ELKTON LIMESTONE INC 2760 1422 CRUSHED AND BROKEN LIMESTONE
20020          VA ASPHALT PAVING CO 7777 2951 PAVING MIXTURES AND BLOCKS
20021          LONE JACK LIMESTONE  7777 2951 PAVING MIXTURES AND BLOCKS
20022          CUPP BLACK TOP, INC. 7777 2951 PAVING MIXTURES AND BLOCKS
20023          ADAMS CONSTRUCTION   7777 2951 PAVING MIXTURES AND BLOCKS
20024          HERDON PAVING        7777 2951 PAVING MIXTURES AND BLOCKS
20025          FARRIER PAVING CO.   0260 2951 PAVING MIXTURES AND BLOCKS
20026          VALLEY PAVING CO     7777 2951 PAVING MIXTURES AND BLOCKS
20027          MOORE BROS. CO.      7777 2951 PAVING MIXTURES AND BLOCKS
20027          MOORE BROS. CO.      7777 2951 PAVING MIXTURES AND BLOCKS
20028          STEWART M.PERRY,INC. 1220 1422 CRUSHED AND BROKEN LIMESTONE
20029          JOHN A. HALL & CO.   7777 2951 PAVING MIXTURES AND BLOCKS
20030          SAWYER THOMAS CO.    7777 2951 PAVING MIXTURES AND BLOCKS
20031          VA. ASPHALT PAVING   7777 2951 PAVING MIXTURES AND BLOCKS
20032          ADAMS CONSTRUCTION   7777 2951 PAVING MIXTURES AND BLOCKS
20033          ADAMS CONSTRUCTION   7777 2951 PAVING MIXTURES AND BLOCKS
20035          S.R. DRAPER          7777 2951 PAVING MIXTURES AND BLOCKS
20036          ADAMS CONSTRUCTION   7777 2951 PAVING MIXTURES AND BLOCKS
20037          ADAMS CONSTRUCTION   7777 2951 PAVING MIXTURES AND BLOCKS
20038          LAYMAN AND SONS      7777 2951 PAVING MIXTURES AND BLOCKS
20039          BLAKEMORE CONSTR COR 7777 2951 PAVING MIXTURES AND BLOCKS
20041          ADAMS CONSTRUCTION   7777 2951 PAVING MIXTURES AND BLOCKS
20045          NATIONAL FRUIT PROD. 1220 2033 CANNED FRUITS AND VEGETABLES
20053          BUCKLEY-LAGES INC    7777 2951 PAVING MIXTURES AND BLOCKS
20065          HOLLY FARMS PLTRY    2880 2015 2015
20077          UMC INDUSTRIES, INC. 2740 2641 PAPER COATING AND GLAZING
20081          VIRGINIA FOUNDRY CO  2720 3321 GRAY IRON FOUNDRIES
20085          ELKTON PAVING,INC.   2760 2951 PAVING MIXTURES AND BLOCKS
20087          ROCCO,INC.           2760 2042 GRAIN MILL PRODUCTS
20091          GROENDYK MFG CORP    0460 3069 FABRICATED RUBBER PRODUCTS NEC
20093          AILEEN, INC.         2080 2339 WOMEN'S & MISSES OUTERWEAR NEC
20116          CHARLES W. BARGER    2740 1422 CRUSHED AND BROKEN LIMESTONE
20117          MADISON UNIVERSITY   2760 8221 COLLEGES AND UNIVERSITIES, NEC
20119          COVINGTON, CITY OF   7777 2951 PAVING MIXTURES AND BLOCKS
20123          MOHAWK RUBBER CO     2720 3011 TIRES AND INNER TUBES
20124          VA. POLYTECH. INST.  2020 8221 COLLEGES AND UNIVERSITIES, NEC
20131          ROANOKE ELEC STEEL   2720 3313 ELECTROMETALLURGICAL PRODUCTS
20139          JEFFERSON MILLS DIV. 2580 2282 THROWING AND WINDING MILLS
20144          TRIANGLE E BYPRODUCT 2760 2042 GRAIN MILL PRODUCTS
20183          RUBBERMAID COM. PROD 3380 3079 MISCELLANEOUS PLASTICS PRODUCT
20186          ROCKINGHAM POULTRY   2320 0250 0250
20189          AMERICAN SAFETY RAZ9 0260 3421 CUTLERY
```

Preceding page blank

QUICK LOOK REPORT

05/20/81 COMPLIANCE DATA SYSTEM

SPECIAL VIRGINIA REGION REPORT

STATE REG. NO.	SOURCE NAME	CNTY	SIC	SIC CODE DESCRIPTION
20203	BOND LUMBR & MILWRK	2760	2512	UPHOLSTERED HOUSEHOLD FURNITUR
20208	C.S.MUNDY, QUARRIES	2760	1420	CRUSHED AND BROKEN STONE
20212	SINGER	2720	2511	WOOD HOUSEHOLD FURNITURE
20214	KINGS DAUGHTER HOSP	0260	0062	GENERAL MEDICAL & SURGICAL HOS
20215	CONCRETE READY MIXED	2720	3273	READY-MIXED CONCRETE
20225	NATIONAL GYPSUM CO	1300	3274	LIME
20231	LONE STAR INDUSTRIES	2720	3241	CEMENT, HYDRAULIC
20232	LONE STAR CEMENT	0460	3241	CEMENT, HYDRAULIC
20232	LONE STAR CEMENT COR	0460	3241	CEMENT, HYDRAULIC
20237	CROWN CORK & SEAL	1220	3411	METAL CANS
20241	JAMISON BLACK MARBLE	2760	1429	CRUSHED AND BROKEN STONE NEC
20244	JW KALBACK & SONS	1220	2421	SAWMILLS & PLANING MILLS GEN
20252	CHEMSTONE CORP	2800	3274	LIME
20263	P.W.PLUMLY LUMBER CO	1220	2421	SAWMILLS & PLANING MILLS GEN
20269	BURLINGTON IND	2740	2271	WOVEN CARPETS AND RUGS
20271	BURLINGTON IND INC	2580	2262	FINISHING PLANTS, SYNTHETICS
20300	COLEMAN FURNITURE CO	2500	2511	WOOD HOUSEHOLD FURNITURE
20302	OLD VIRGINIA BRICK	2720	3251	BRIC AND STRUCTURAL CLAY TILE
20304	CELANESE FIBERS CO	1300	2823	CELLULOSIC MAN-MADE FIBERS
20320	JAMES RIV LIMESTONE	0460	3274	LIME
20321	HOOVER COLOR CORP.	2580	2816	INORGANIC PIGMENTS
20322	HERCULES, INC.	2580	2816	INORGANIC PIGMENTS
20325	STUART M. PERRY, INC	1220	1422	CRUSHED AND BROKEN LIMESTONE
20326	STUART M PERRY,INC	1220	1422	CRUSHED AND BROKEN LIMESTONE
20328	WESTVACO CORP PULP	0100	2621	PAPER MILLS EXC BUILDING PAPER
20329	WESTVACO CHEM DIV	0100	2819	INDUSTRIAL INORGANIC CHEMICALS
20333	O'SULLIVAN CORP.	1220	3079	MISCELLANEOUS PLASTICS PRODUCT
20334	WALKER MACHN & FOUND	2720	3321	GRAY IRON FOUNDRIES
20335	VA OAK TANNERY	2320	3111	LEATHER TANNING AND FINISHING
20337	WAYN-TEX	0260	2824	ORGANIC FIBERS, NONCELLULOSIC
20340	WEBLITE CORP	0460	3295	MINERALS, GROUND OR TREATED
20341	VIRGINIA LIME CO	1300	3274	LIME
20342	GEORGIA BONDED FIBER	2740	2200	2200
20381	LYNCHBURG FOUNDRY	2020	3321	GRAY IRON FOUNDRIES
20383	BUENA VISTA RDY MIX	2740	3273	READY-MIXED CONCRETE
20391	PANTASOTE	0100	3069	FABRICATED RUBBER PRODUCTS NEC
20397	SHELL OIL COMPANY	2720	5171	PETROLEUM BULK STATIONS & TERM
20405	ZUCHERMAN CO. INC.	1220	3441	FABRICATED STRUCTURAL METAL
20411	WAYNE MFG.CO.	0260	3442	METAL DOORS, SASH, AND TRIM
20412	WESTERN STATE HOSP	0260	8061	HOSPITALS
20413	CROMPTON-SHENENDOAH	0260	2299	TEXTILE GOODS, NEC
20417	DAVIS PAVING CO	7777	2951	PAVING MIXTURES AND BLOCKS
20422	TAMCO MOTORS	2320	3621	MOTORS AND GENERATORS
20429	VA LIMESTONE CORP	1300	1422	CRUSHED AND BROKEN LIMESTONE
20430	ABEX CORPORATION	1220	3292	ASBESTOS PRODUCTS
20430	ABEX CORPORATION	1220	3292	ASBESTOS PRODUCTS

QUICK LOOK REPORT

05/20/81 COMPLIANCE DATA SYSTEM

SPECIAL VIRGINIA REGION REPORT

STATE REG. NO.	SOURCE NAME	CNTY	SIC	SIC CODE DESCRIPTION
20431	RADFORD LIMESTONE 1	2580	1422	CRUSHED AND BROKEN LIMESTONE
20432	RADFORD LIMESTONE 2	2580	1422	CRUSHED AND BROKEN LIMESTONE
20433	RADFORD LIMESTONE	2020	1446	INDUSTRIAL SAND
20434	RADFORD LIMESTONE 3	2020	1422	CRUSHED AND BROKEN LIMESTONE
20435	RADFORD LIMESTONE 4	2020	1422	CRUSHED AND BROKEN LIMESTONE
20437	HARDWOOD LUMBER CORP	1540	2421	SAWMILLS & PLANING MILLS GEN
20438	TAYLOR RAMSEY	2740	2421	SAWMILLS & PLANING MILLS GEN
20439	VULCAN MATERIALS	0260	3295	MINERALS, GROUND OR TREATED
20444	FLOW RESEARCH ANIMAL	2580	8999	SERVICES, NEC
20447	WEBSTER BRICK	0460	3251	BRIC AND STRUCTURAL CLAY TILE
20448	SOUTHERN STATES COOP	2720	2042	GRAIN MILL PRODUCTS
20450	BLUE RIDGE STONE	0460	1422	CRUSHED AND BROKEN LIMESTONE
20451	HARRIS HARDWOOD CO.	2720	2426	HARDWOOD DIMENSION & FLOORING
20452	M J GROVE LIME CO	1220	1422	CRUSHED AND BROKEN LIMESTONE
20453	M.J.GROVE LIME CO.	1220	3295	MINERALS, GROUND OR TREATED
20454	ALLIED CHEMICAL CORP	3260	2819	INDUSTRIAL INORGANIC CHEMICALS
20455	ALLIED CHEM CORP	2580	2819	INDUSTRIAL INORGANIC CHEMICALS
20456	ROCKYDALE QUARRIES	2720	1422	CRUSHED AND BROKEN LIMESTONE
20457	ROCKYDALE QUARRIES	2720	3274	LIME
20458	JAMES RIV LIMESTONE	0460	3274	LIME
20460	APP POWER-GLEN LYN	1300	4911	ELECTRICAL SERVICES
20461	STATE STONE CORP	2720	1422	CRUSHED AND BROKEN LIMESTONE
20462	STATE STONE CORP	1300	1422	CRUSHED AND BROKEN LIMESTONE
20468	NORFOLK & WESTERN	2720	3743	RAILROAD EQUIPMENT
20469	RELIANCE UNIV.	2720	2851	PAINTS AND ALLIED PRODUCTS
20470	PULASKI FURNITURE	2580	2511	WOOD HOUSEHOLD FURNITURE
20471	LONE JACK LIMESTONE	2740	1422	CRUSHED AND BROKEN LIMESTONE
20475	AVTEX	3260	2823	CELLULOSIC MAN-MADE FIBERS
20476	BRIDGEWATER COLLEGE	2760	8221	COLLEGES AND UNIVERSITIES, NEC
20477	VETERANS ADMIN. HOS.	2720	8062	GENERAL MEDICAL & SURGICAL HOS
20480	STANLEY FURNITURE	0260	2511	WOOD HOUSEHOLD FURNITURE
20481	STANLEY FURNITURE	0260	2421	SAWMILLS & PLANING MILLS GEN
20482	ACCO STONE	7777	1422	CRUSHED AND BROKEN LIMESTONE
20484	ADAMS CONST. CO	7777	1422	CRUSHED AND BROKEN LIMESTONE
20504	W.S. FREY CO., INC.	1220	1422	CRUSHED AND BROKEN LIMESTONE
20510	HERCULES	0100	2821	PLASTICS MATERIALS AND RESINS
20513	ROCKINGHAM MILLING	2760	2042	GRAIN MILL PRODUCTS
20515	REYNOLDS METAL CO	0260	2821	PLASTICS MATERIALS AND RESINS
20516	REEVES BROS VULCAN	2740	3069	FABRICATED RUBBER PRODUCTS NEC
20517	E.I DUPONT	0260	2824	ORGANIC FIBERS, NONCELLULOSIC
20518	VA. METALCRAFTERS	0260	3446	ARCHITECTURAL METAL WORK
20521	POTOMAC ED-RIVERTON	3260	4911	ELECTRICAL SERVICES
20523	WELLS FURNITURE CO	2720	2500	2500
20523	WELLS FURN.	2720	2511	WOOD HOUSEHOLD FURNITURE
20524	MERCK&CO.INC,CHEM DV	2760	2834	PHARMACEUTICAL PREPARATIONS
20524	MERCK&CO.INC,CHEM DV	2760	2834	PHARMACEUTICAL PREPARATIONS

Reproduced from
best available copy.

QUICK LOOK REPORT

05/20/81 COMPLIANCE DATA SYSTEM

SPECIAL VIRGINIA REGION REPORT

STATE REG. NO.	SOURCE NAME	CNTY	SIC	SIC CODE DESCRIPTION
20526	BLP,INC.	2580	2295	COATED FABRICS, NOT RUBBERIZED
20529	GENERAL SHALE PROD.	2740	3251	BRIC AND STRUCTURAL CLAY TILE
20542	GENERAL ELECTRIC	2720	3622	INDUSTRIAL CONTROLS
20544	KOPPERS CO.	2720	2491	WOOD PRESERVING
20548	ETHAN ALLEN INC	2760	2511	WOOD HOUSEHOLD FURNITURE
20549	ROANOKE READY-MIX	2720	3273	READY-MIXED CONCRETE
20552	ROANOKE READY-MIX	2720	3273	READY-MIXED CONCRETE
20553	WAMPLER FOODS,INC.	2760	2042	GRAIN MILL PRODUCTS
20560	WHITE FOUNDRY CO,INC	2720	3321	GRAY IRON FOUNDRIES
20565	LUCK QUARRY	0260	1422	CRUSHED AND BROKEN LIMESTONE
20569	JAMES RIV LIMESTONE	0460	3274	LIME
20570	RIVERTON CORP	3260	3295	MINERALS, GROUND OR TREATED
20572	GENERAL ELECTRIC	3320	3479	METAL COATING AND ALLIED SERVI
20576	C & O RAILWAY CO.	0100	4000	4000
20581	POFF CONSTRUCTION	2020	1500	1500
20590	CATAWBA HOSPITAL	2720	8062	GENERAL MEDICAL & SURGICAL HOS
20592	GENERAL ELECTRIC CO.	2000	3622	INDUSTRIAL CONTROLS
20596	LEAS & MCVITTEY INC	2720	3111	LEATHER TANNING AND FINISHING
20600	ROCKINGHAM MEM.HOSP	2760	8062	GENERAL MEDICAL & SURGICAL HOS
20609	DOMINION SILO, INC.	2760	3272	CONCRETE PRODUCTS, NEC
20655	REA MAG. WIRE	2740	3357	NONFERROUS WIRE DRAWING/INSULA
20656	RADFORD ARMY AMMO PT	2020	9711	NATIONAL SECURITY
20668	RIVERTON CORP.	3260	1422	CRUSHED AND BROKEN LIMESTONE
20675	VEPCO	0100	4911	ELECTRICAL SERVICES
20676	C S MUNDY QUARRY	2080	1420	CRUSHED AND BROKEN STONE
20677	C S MUNDY QUARRIES	7777	2951	PAVING MIXTURES AND BLOCKS
20679	JOHN HANDLEY HGH SCH	1220	8211	ELEMENTARY AND SECONDARY SCHOO
20680	WINCHESTER INTER SCH	1220	8211	ELEMENTARY AND SECONDARY SCHOO
20681	QUARLES ELEM SCHOOL	1220	8211	ELEMENTARY AND SECONDARY SCHOO
20683	JOHN KERR MIDDLE SCH	1220	8211	ELEMENTARY AND SECONDARY SCHOO
20684	ATLANTIC LUMBER	2740	2421	SAWMILLS & PLANING MILLS GEN
20688	FORECAST FURNITURE	1220	2512	UPHOLSTERED HOUSEHOLD FURNITUR
20697	UNIMIN CORP.	1220	3295	MINERALS, GROUND OR TREATED
20698	STAR FOUNDRY PRODUCT	2720	3321	GRAY IRON FOUNDRIES
20709	BURKE-PARSONS-BOWLBY	2740	2491	WOOD PRESERVING
20711	MENNEL MILLING CO.	2720	2041	FLOUR & OTHER GRAIN MILL PROD
20717	DUNCAN BROS TIRE CO.	1220	3011	TIRES AND INNER TUBES
20723	SHENANDOAH BRICK	1220	1459	CLAY AND RELATED MINERALS NEC
20733	HARDEE'S	2020	5812	EATING PLACES
20735	GALLIMORE PAVING CO	2580	2951	PAVING MIXTURES AND BLOCKS
20742	GRAHAM-WHITE MFG CO.	2720	3741	3741
20763	WOLVERINE	2020	3293	GASKETS/PACKING/SEALING DEVICE
20764	JOHNS-MANVILLE	2080	2661	BUILDING PAPER AND BOARD MILLS
20765	WHITE MOTOR	2580	3713	TRUCK AND BUS BODIES
20771	QUALITY FEEDS, INC.	2760	2042	GRAIN MILL PRODUCTS
20786	ROCKINGHAM POULTRY	2760	2042	GRAIN MILL PRODUCTS

QUICK LOOK REPORT

05/20/81 COMPLIANCE DATA SYSTEM

SPECIAL VIRGINIA REGION REPORT

STATE REG. NO.	SOURCE NAME	CNTY	SIC	SIC CODE DESCRIPTION
20789	PULASKI FURNTRE CORP	2580	2511	WOOD HOUSEHOLD FURNITURE
20794	STAUNTON LIME CO.	0180	2812	ALKALIES AND CHLORINE
20794	STAUNTON LIMESTONE	0260	1422	CRUSHED AND BROKEN LIMESTONE
20796	SISSON & RYAN	2020	2351	MILLINERY
20797	SISSON & RYAN	2020	1422	CRUSHED AND BROKEN LIMESTONE
20826	D.C. HEATWOLE CO.	2760	7534	TIRE RETREADING AND REPAIR SHO
20828	VA. HOT SPRINGS	0300	7011	HOTELS, MOTELS, AND TOURIST CO
20830	CAMELOT HALL NURSING	2720	8050	8050
20832	HERSHEY TIRE COMPANY	0260	7534	TIRE RETREADING AND REPAIR SHO
20834	VEPCO	0300	4910	4910
20835	BOISE CASCADE	0760	2434	WOOD KITCHEN CABINETS
20872	CHEMSTONE CORP. FEV	2800	3399	PRIMARY METAL PRODUCTS, NEC
20878	VA LIME CO-FOOTE MIN	1300	3274	LIME
20878	VIRGINIA LIME	1300	3295	MINERALS, GROUND OR TREATED
20880	CARR'S TIRE DIST.INC	2760	5014	TIRES AND TUBES
20883	L.H.SAWYER PAVING CO	7777	2951	PAVING MIXTURES AND BLOCKS
20888	CYCLE SYSTEMS INC	2720	3341	SECONDARY NONFERROUS METALS
20904	MCVITTY HOUSE	2720	8361	RESIDENTIAL CARE
20911	BLACKSBURG SANI AUTH	2020	4952	SEWERAGE SYSTEMS
20914	ADAMS CONSTRUCTION	2020	2951	PAVING MIXTURES AND BLOCKS
20921	U.S. POSTAL SERVICE	1220		
20937	FIRST NAT'L EXC BANK	2720	6025	NATIONAL BANKS, FEDERAL RESERV
20957	SALEM, CITY	2720	4953	REFUSE SYSTEMS
20971	ADAMS CONSTRUCTION	2740	2951	PAVING MIXTURES AND BLOCKS
20972	A.N. JOHNSTON	2760	2951	PAVING MIXTURES AND BLOCKS
20972	A.N. JOHNSTON	7777	2951	PAVING MIXTURES AND BLOCKS
20980	LEE HY PAVING	1220	2951	PAVING MIXTURES AND BLOCKS
20982	WEST SAND & GRAVEL	2760	1422	CRUSHED AND BROKEN LIMESTONE
20991	EXXON	2720	5171	PETROLEUM BULK STATIONS & TERM
20995	MARATHON OIL	2720	5171	PETROLEUM BULK STATIONS & TERM
30001	AMELIA LUMBER CORP.	0140	2421	SAWMILLS & PLANING MILLS GEN
30010	W.C.MORGAN LUMBER CO	1980	2420	2420
30020	SHORT PAVING CO.,INC	7777	2951	PAVING MIXTURES AND BLOCKS
30021	LAWHORNE BROS.	7777	2951	PAVING MIXTURES AND BLOCKS
30022	M.V.TEMPLETON,INC.	7777	2951	PAVING MIXTURES AND BLOCKS
30024	ADAMS CONSTRUCTION	7777	2951	PAVING MIXTURES AND BLOCKS
30026	M.V.TEMPLETON INC	7777	2951	PAVING MIXTURES AND BLOCKS
30028	DAYSTROM FURN CO.	1420	2512	UPHOLSTERED HOUSEHOLD FURNITUR
30029	THOMPSON ART PAVING	7777	2951	PAVING MIXTURES AND BLOCKS
30030	THOMPSON ARTH PAVING	7777	2951	PAVING MIXTURES AND BLOCKS
30031	THOMPSON ART PAVING	7777	2951	PAVING MIXTURES AND BLOCKS
30041	JP STEVENS & CO INC	1200	2221	WEAVING MILLS, SYNTHETICS
30042	V.M.DRAPER MFG.	1520	2426	HARDWOOD DIMENSION & FLOORING
30043	ANDERSON LUMBER CO	0140	2421	SAWMILLS & PLANING MILLS GEN
30053	BARNES LUMBER CORP.	0540	2426	HARDWOOD DIMENSION & FLOORING
30064	JP STEVENS-& CO	1200	2511	WOOD HOUSEHOLD FURNITURE

Reproduced from best available copy.

```
                                                    QUICK LOOK REPORT
.........................................................................
   05/20/81                                       COMPLIANCE DATA SYSTEM

                                          SPECIAL VIRGINIA REGION REPORT

.........................................................................

 STATE REG. NO.      SOURCE NAME     CNTY  SIC SIC CODE DESCRIPTION
.........................................................................

30068           J.P.STEVENS & CO INC 1420 2221 WEAVING MILLS, SYNTHETICS
30069           DANVILLE POWER PLANT 2380 4910 4910 .
30076           CONTINENTAL CAN CO.  1520 2653 CORRUGATED AND SOLID FIBER BOX
30081           COMMODORE CORP.      2380 3791 3791
30093           VIRGINIA CRAFTS,INC. 0660 2272 TUFTED CARPETS AND RUGS
30097           AMERICAN FURNITURE   1520 2512 UPHOLSTERED HOUSEHOLD FURNITUR
30103           SOUTHERN FACILITIES  0340 5171 PETROLEUM BULK STATIONS & TERM
30106           GOODYEAR TIRE&RUBBER 2380 2822 SYNTHETIC RUBBER
30118           STAR PAPER TUBE INC  2380 2655 FIBER CANS DRUMS LIKE PRODUCTS
30120           WHITTLE PLYWOOD CORP 2380 2430 2430
30121           LYNCHBURG FOUNDRY    0580 3321 GRAY IRON FOUNDRIES
30122           BUFFALO SHOOK        2480 2449 WOOD CONTAINERS, NEC
30123           PIEDMONT MILLS,INC.  0580 2041 FLOUR & OTHER GRAIN MILL PROD
30124           MEREDITH/BURDA       0580 2751 COMMERCIAL PRINTING LETTERPRES
30126           ROSS LABORATORIES    0580 2833 MEDICINALS AND BOTANICALS
30130           CHAMPION BUILD. PROD 1420 2436 SOFTWOOD VENEER AND PLYWOOD
30133           PHILLIPS PETROLEUM   0340 5171 PETROLEUM BULK STATIONS & TERM
30151           HANSON PORCELAIN CO. 0580 3461 3461
30155           SOUTHSIDE MFG.CO.    2380 2531 PUBLIC BUILDING & RELATED FURN
30171           GRAVELY FURNITURE    1520 2511 WOOD HOUSEHOLD FURNITURE
30173           HOMECRAFT CORP       1980 3791 3791
30175           DOYLE READY-MIX CONC 1520 3273 READY-MIXED CONCRETE
30181           FIELDCREST MILLS     1520 2211 WEAVING MILLS, COTTON
30183           MARTINSVILLE NOVELTY 1520 2511 WOOD HOUSEHOLD FURNITURE
30184           BARNES MFG. CO.      1800 2421 SAWMILLS & PLANING MILLS GEN
30185           IMPERIAL BRIQUET COR 1800 2861 GUM AND WOOD CHEMICALS
30186           SMITH-DOUGLASS       2380 2871 2071
30188           MEAD CP (LNCHBG BRD) 0580 2631 PAPERBOARD MILLS
30193           ROCKYDALE QUARRIES   0580 3295 MINERALS, GROUND OR TREATED
30200           SOLITE CORPORATION   0540 1429 CRUSHED AND BROKEN STONE NEC
30211           HALIFAX COTTON MILLS 1420 2211 WEAVING MILLS, COTTON
30215           ALLEN MORRISON       0580 3993 SIGNS AND ADVERTISING DISPLAYS
30218           BURRUSS LAND & LUMBR 0580 2426 HARDWOOD DIMENSION & FLOORING
30219           BURRUSS LAND & LUMBR 0580 2426 HARDWOOD DIMENSION & FLOORING
30220           TEXACO,INC.          0340 5171 PETROLEUM BULK STATIONS & TERM
30229           BLUE RIDGE TALC CO   1520 2851 PAINTS AND ALLIED PRODUCTS
30230           HOLLY FARMS POULTRY  2260 0259 POULTRY AND EGGS NEC
30231           LYNCHBURG FOUNDRY CO 0580 3321 GRAY IRON FOUNDRIES
30232           AMOCO,INC.           0340 5171 PETROLEUM BULK STATIONS & TERM
30233           LESTER LUMBER CO INC 1520 2426 HARDWOOD DIMENSION & FLOORING
30240           DAN RIVER,INC.       2380 2211 WEAVING MILLS, COTTON
30241           DAN RIVER MILLS      2380 2211 WEAVING MILLS, COTTON
30243           TULLY CORPORATION    1420 2800 CHEMICALS AND ALLIED PRODUCTS
30248           LANE CO., INC.       0580 2511 WOOD HOUSEHOLD FURNITURE
30249           FELTON BROS TRAN MIX 1420 3271 CONCRETE BLOCK AND BRICK
30253           DOYLE LUMBER, INC    1520 2421 SAWMILLS & PLANING MILLS GEN
```

```
                                                    QUICK LOOK REPORT
......................................................................................

   05/20/81                                        COMPLIANCE DATA SYSTEM

                                           SPECIAL VIRGINIA REGION REPORT


......................................................................................

 STATE REG. NO.        SOURCE NAME        CNTY  SIC SIC CODE DESCRIPTION
......................................................................................

 30260           BABCOCK & WILCOX        0580 2819 INDUSTRIAL INORGANIC CHEMICALS
 30261           HOOKER FURNITURE        1520 2511 WOOD HOUSEHOLD FURNITURE
 30264           CITGO,INC               0340 5171 PETROLEUM BULK STATIONS & TERM
 30266           BURLINGTON INDUSTRIE    1420 2221 WEAVING MILLS, SYNTHETICS
 30279           LANE COMPANY            1200 2511 WOOD HOUSEHOLD FURNITURE
 30280           LANE CO.,INC.           1200 2511 WOOD HOUSEHOLD FURNITURE
 30283           DAN RIVER,INC.          2300 2211 WEAVING MILLS, COTTON
 30284           BASSETT TABLE CO        1520 2511 WOOD HOUSEHOLD FURNITURE
 30285           BASSETT SUPERIOR        1520 2511 WOOD HOUSEHOLD FURNITURE
 30286           BASSETT FURNITURE       1520 3700 3700
 30287           BASSETT FURNIUR IND     1520 2511 WOOD HOUSEHOLD FURNITURE
 30288           BASSETT FURNITURE       1520 2511 WOOD HOUSEHOLD FURNITURE
 30289           BASSETT FURNITUR PLT    1520 3027 3027
 30291           APPOMATTOX LIME CO      0180 2621 PAPER MILLS EXC BUILDING PAPER
 30296           RUBATEX CORP            0340 3069 FABRICATED RUBBER PRODUCTS NEC
 30297           SOLITE CORP             2300 3251 BRIC AND STRUCTURAL CLAY TILE
 30310           WEST SAND&GRAVEL CO.    0500 1429 CRUSHED AND BROKEN STONE NEC
 30319           STANLEY FURNITURE CO    1200 2511 WOOD HOUSEHOLD FURNITURE
 30320           STANLEY FURNITURE CO    1520 2541 WOOD PARTITIONS AND FIXTURES
 30321           E.I.DUPONT              1520 2824 ORGANIC FIBERS, NONCELLULOSIC
 30327           J.P. STEVENS & CO.      2340 2241 NARROW FABRIC MILLS
 30328           J.P.STEVENS & CO INC    2340 2241 NARROW FABRIC MILLS
 30330           U.S.GYPSUM CO.          2380 3275 GYPSUM PRODUCTS
 30349           RAILWAY HANDLE CORP.    1800 2491 WOOD PRESERVING
 30356           MARTINSVILLE STONE      1520 3295 MINERALS, GROUND OR TREATED
 30358           BLUE RIDGE STONE        0580 1422 CRUSHED AND BROKEN LIMESTONE
 30359           BUTLER LUMBER CO        1980 2420 2420
 30360           LONGWOOD COLLEGE        2430 8221 COLLEGES AND UNIVERSITIES, NEC
 30361           KYANITE MINING CORP     2480 1459 CLAY AND RELATED MINERALS NEC
 30362           KYANITE MINING CORP.    0540 1459 CLAY AND RELATED MINERALS NEC
 30364           KYANITE MINING CORP     0540 1459 CLAY AND RELATED MINERALS NEC
 30365           KYANITE MINING CORP.    2480 1459 CLAY AND RELATED MINERALS NEC
 30366           APPOMATTOX LIME CO.     0180 8211 ELEMENTARY AND SECONDARY SCHOO
 30378           BURLINGTON IND.         0580 2231 WEAVING & FINISHING MILLS WOOL
 30379           BURLINGTON INDUST       2380 2262 FINISHING PLANTS, SYNTHETICS
 30381           NATIONAL HOME MANU      1520 2433 2433
 30386           MW MANUFACTURERS        1200 2431 MILLWORK
 30387           FRANKLIN VENEER CO      1200 2436 SOFTWOOD VENEER AND PLYWOOD
 30388           GUYER-ROBERTS MANUF     1200 2499 WOOD PRODUCTS, NEC
 30389           OWENS ILLINOIS          0340 2631 PAPERBOARD MILLS
 30392           ERATH VENEER CORP.      1200 2436 SOFTWOOD VENEER AND PLYWOOD
 30394           VULCAN MATERIALS        1420 1423 CRUSHED AND BROKEN GRANITE
 30395           VULCAN MATERIALS        0500 1423 CRUSHED AND BROKEN GRANITE
 30396           VULCAN MATERIALS CO.    2380 1423 CRUSHED AND BROKEN GRANITE
 30397           GRIFFIN PIPE PRTS CO    0580 3321 GRAY IRON FOUNDRIES
 30401           BURLINGTON INDUST       1980 2299 TEXTILE GOODS, NEC
```

Reproduced from
best available copy.

```
                                                   QUICK LOOK REPORT
..................................................................................
        05/20/81                                COMPLIANCE DATA SYSTEM

                                       SPECIAL VIRGINIA REGION REPORT

..................................................................................

 STATE REG. NO.      SOURCE NAME      CNTY  SIC SIC CODE DESCRIPTION
..................................................................................
30402          HENRY CO PLYWOOD     1520 2499 WOOD PRODUCTS, NEC
30409          BASSETT-WALKER KNTNG 1520 2253 KNIT OUTERWEAR MILLS
30413          LUCK QUARRIES        2260 1423 CRUSHED AND BROKEN GRANITE
30415          COLONIAL PIPELINE CO 0900 4600 4600
30418          BASSETT-WALKER KNTTG 1520 1900 1900
30419          GENERAL ELECTRIC CO. 0580 3662 RADIO/TV COMMUNICATION EQUIPMN
30444          BOISE CASCADE CORP   2380 2432 2432
30447          H.S.NASH LUMBER CORP 0580 2420 2420
30451          PIEDMONT STATE HOSP  2260 8061 HOSPITALS
30452          LYNCHBURG TRAIN SCHL 0160 8200 8200
30457          BASSETT VENEER CORP  0160 2436 SOFTWOOD VENEER AND PLYWOOD
30458          BASSETT VENEER CORP  2260 2435 HARDWOOD VENEER AND PLYWOOD
30459          BRUNSWICK BOX CO.    0500 2499 WOOD PRODUCTS, NEC
30462          MOSELEY&NASH ENTER.  0500 2221 WEAVING MILLS, SYNTHETICS
30463          LONE STAR IND.       0500 3273 READY-MIXED CONCRETE
30476          STUART LUMBER CORP   2340 2421 SAWMILLS & PLANING MILLS GEN
30480          DOLLY MADISON INC    2260 2512 UPHOLSTERED HOUSEHOLD FURNITUR
30510          WILSON QUARRIES      1520 3251 BRIC AND STRUCTURAL CLAY TILE
30514          DISSTON,INC          2380 3425 HAND SAWS AND SAW BLADES
30515          PULASKI FURNITURE    1520 2511 WOOD HOUSEHOLD FURNITURE
30517          DUNNINGTON-BEACH TOB 2480 3523 FARM MACHINERY AND EQUIPMENT
30538          ARVONIA BUCKHM.SLATE 0540 1429 CRUSHED AND BROKEN STONE NEC
30540          FELTON BROS TRAN MIX 7777 2951 PAVING MIXTURES AND BLOCKS
30541          FELTON BROS TRAN MIX 1980 3273 READY-MIXED CONCRETE
30542          FELTON BROS TRAN MIX 1980 3273 READY-MIXED CONCRETE
30544          FELTON BROS TRAN MIX 1980 3273 READY-MIXED CONCRETE
30545          FELTON BROS TRAN MIX 7777 2951 PAVING MIXTURES AND BLOCKS
30549          VA. FIBRE CORP.      0160 2621 PAPER MILLS EXC BUILDING PAPER
30579          BUTLER LUMBER CO.    0500 2441 NAILED WOOD BOXES AND SHOOK
30585          FREEMAN CHEM. CORP.  2380 2821 PLASTICS MATERIALS AND RESINS
30591          ROY N. FORD,INC      7777 2951 PAVING MIXTURES AND BLOCKS
30592          FALWELL ASP&EXCAV.CO 7777 2951 PAVING MIXTURES AND BLOCKS
30594          DEE&LEE PAVING CO.   0660 1610 1610
30616          TRANSMARK OPERATIONS 0180 2511 WOOD HOUSEHOLD FURNITURE
30676          MOSELEY & NASH ENTPS 0500 2221 WEAVING MILLS, SYNTHETICS
30679          HENRY CO PUBLIC SCHL 1520 8211 ELEMENTARY AND SECONDARY SCHOO
30691          AMER.FURNITURE PLT10 1520 2511 WOOD HOUSEHOLD FURNITURE
30692          AM. FURN. PLANT6,7,8 1520 2511 WOOD HOUSEHOLD FURNITURE

                    TOTAL NUMBER QUICK LOOK REPORT LINES      360
```

APPENDIX B

SUMMARY OF COMPLIANCE STATUS FOR SOURCES IN REGION II

```
                                    QUICK LOOK REPORT
.........................................................................................................
 11/04/81                           COMPLIANCE DATA SYSTEM1                              PAGE     1
                                    QUICK LOOK SUMMARY REGION II

.........................................................................................................
STATE REG. NO.      SOURCE NAME     SIC CMST ECAT ATPE DATE SCH ACTION DESCRIP  STAT DATE ACH RESULTS DESCRIP PERS
.........................................................................................................
```

Preceding page blank

```
20001      DRAGON CHEMICAL CO.  2079 3    2    08   10/31/81 STATE INSPECT'N         / /
                                               08   09/30/80 STATE INSPECT'N 30   03/12/80 IN COMPLIANCE
                                               08   09/30/81 STATE INSPECT'N 30   10/09/81 IN COMPLIANCE
                                               08   09/30/82 STATE INSPECT'N         / /
20005      FRAZIER QUARRY,INC.  1422 4    2    08   09/30/80 STATE INSPECT'N 30   09/12/80 IN COMPLIANCE
                                               08   09/30/81 STATE INSPECT'N         / /
                                               08   09/30/82 STATE INSPECT'N         / /
20018      ELKTON LIMESTONE INC 1022 3    3    08   09/30/80 STATE INSPECT'N 30   05/19/80 IN COMPLIANCE
                                               49   09/30/81 EPA OVR INSPECT         / /
                                               08   09/30/81 STATE INSPECT'N         / /
                                               08   09/30/82 STATE INSPECT'N         / /
20021      LONE JACK LIMESTONE  2951 4    1    08   09/30/80 STATE INSPECT'N      10/03/79
                                               08   09/30/81 STATE INSPECT'N         / /
                                               08   09/30/82 STATE INSPECT'N         / /
20022      CUPP BLACK TOP, INC. 2951 3    2    08   09/30/80 STATE INSPECT'N 30   04/10/80 IN COMPLIANCE
                                               08   09/30/81 STATE INSPECT'N         / /
                                               08   09/30/82 STATE INSPECT'N         / /
20023      ADAMS CONSTRUCTION   2951 3    2    06   09/30/80 STATE INSPECT'N 30   11/14/79 IN COMPLIANCE
                                               08   09/30/81 STATE INSPECT'N         / /
                                               08   09/30/82 STATE INSPECT'N         / /
20024      WELLS CONSTRUCTION   2951 4    2    08   09/30/80 STATE INSPECT'N 41   09/30/80 NOT IN OPERATIO
                                               49   09/30/81 EPA OVR INSPECT 30   09/10/81 IN COMPLIANCE
                                               08   09/30/81 STATE INSPECT'N         / /
```

```
                                            08   09/30/82 STATE INSPECT'N       /  /
20025       FARRIER PAVING CO.   2951 3   2   08   05/31/82 STATE INSPECT'N       /  /
                                            08   09/30/80 STATE INSPECT'N 30   09/12/80 IN COMPLIANCE
                                            08   09/30/81 STATE INSPECT'N 30   05/11/81 IN COMPLIANCE
                                            08   09/30/82 STATE INSPECT'N       /  /
20026       VALLEY PAVING CO     2951 4   3   08   09/30/80 STATE INSPECT'N 41   09/03/80 NOT IN OPERATIO
                                            08   09/30/81 STATE INSPECT'N       /  /
                                            08   09/30/82 STATE INSPECT'N       /  /
20027       MOORE BROS. CO.      2951 3   2   08   05/31/81 STATE INSPECT'N       /  /
                                            08   09/30/80 STATE INSPECT'N 30   09/10/80 IN COMPLIANCE
                                            08   09/30/81 STATE INSPECT'N 30   05/11/81 IN COMPLIANCE
                                            08   09/30/82 STATE INSPECT'N       /  /
20029       JOHN A. HALL & CO.   2951 3   3   08   09/30/80 STATE INSPECT'N 30   06/13/80 IN COMPLIANCE
                                            08   09/30/81 STATE INSPECT'N       /  /
                                            08   09/30/82 STATE INSPECT'N       /  /
20030       SAWYER THOMAS CO.    2951 9   2   08   09/30/80 STATE INSPECT'N       /  /
                                            08   09/30/81 STATE INSPECT'N       /  /
                                            08   09/30/82 STATE INSPECT'N       /  /
20031       VA. ASPHALT PAVING   2951 3   3   08   09/30/80 STATE INSPECT'N 30   05/07/80 IN COMPLIANCE
                                            08   09/30/81 STATE INSPECT'N       /  /
                                            08   09/30/82 STATE INSPECT'N       /  /
20032       ADAMS CONSTRUCTION   2951 4   2   08   11/31/81 STATE INSPECT'N       /  /
                                            08   09/30/80 STATE INSPECT'N 30   11/05/80 IN COMPLIANCE
```

Reproduced from
best available copy.

					08	09/30/81	STATE INSPECT'N		/ /	
					08	09/30/82	STATE INSPECT'N		/ /	
20033	ADAMS CONSTRUCTION	2951	4	2	08	10/31/81	STATE INSPECT'N	41	04/14/81	NOT IN OPERATIO
					08	06/30/82	STATE INSPECT'N		/ /	
					08	09/30/80	STATE INSPECT'N		/ /	
					49	09/30/81	EPA OVR INSPECT		/ /	
					08	09/30/81	STATE INSPECT'N	30	10/02/80	IN COMPLIANCE
					08	09/30/82	STATE INSPECT'N		/ /	
20035	S.R. DRAPER	2951	3	3	08	09/30/80	STATE INSPECT'N	30	00/00/80	IN COMPLIANCE
					08	09/30/81	STATE INSPECT'N		/ /	
					08	09/30/82	STATE INSPECT'N		/ /	
20036	ADAMS CONSTRUCTION	2951	3	3	08	04/15/81	STATE INSPECT'N	30	04/15/81	IN COMPLIANCE
					08	09/30/80	STATE INSPECT'N		00/00/00	
					08	09/30/81	STATE INSPECT'N	30	10/16/80	IN COMPLIANCE
					49	09/30/80	EPA OVR INSPECT	30	06/25/80	IN COMPLIANCE
					08	04/30/82	STATE INSPECT'N		/ /	
					08	09/30/82	STATE INSPECT'N		/ /	
20037	ADAMS CONSTRUCTION	2951	9	2	08	09/30/80	STATE INSPECT'N		/ /	
					08	09/30/81	STATE INSPECT'N		/ /	
					08	09/30/82	STATE INSPECT'N		/ /	
20038	LAYMAN AND SONS	2951	4	2	08	09/30/80	STATE INSPECT'N		/ /	
					08	09/30/81	STATE INSPECT'N		/ /	
					08	09/30/82	STATE INSPECT'N		/ /	

20038	LAYMAN AND SONS	2951	2	2	08	09/30/81	STATE INSPECT'N		/ /		E10
					08	09/30/82	STATE INSPECT'N		/ /		
20039	BLAKEMORE CONSTR COR	2951	3	2	08	09/30/80	STATE INSPECT'N	30	07/25/80	IN COMPLIANCE	
					08	09/30/81	STATE INSPECT'N		/ /		
20041	ADAMS CONSTRUCTION	2951	3	3	08	09/30/80	STATE INSPECT'N	30	06/17/80	IN COMPLIANCE	
					49	09/30/80	EPA OVR INSPECT		/ /		
					08	09/30/81	STATE INSPECT'N		/ /		
					08	09/30/82	STATE INSPECT'N		/ /		
20077	UMC INDUSTRIES, INC.	2641	4	2	08	01/31/82	STATE INSPECT'N		/ /		
					08	09/30/80	STATE INSPECT'N		/ /		
					08	09/30/81	STATE INSPECT'N	30	01/14/81	IN COMPLIANCE	
					08	09/30/82	STATE INSPECT'N		/ /		
20081	VIRGINIA FOUNDRY CO	3321	1	1	09	08/31/81	STATE VE TEST	10	08/31/81	OUT OF COMPLIAN	
					Z2	08/31/81	NOTICE OF NON-C	11	08/31/81	OC SCHED REQ	
					08	09/30/81	STATE INSPECT'N		/ /		
					08	09/30/82	STATE INSPECT'N		/ /		
20085	ELKTON PAVING, INC.	2951	3	2	08	09/30/80	STATE INSPECT'N	30	05/19/80	IN COMPLIANCE	
					08	09/30/81	STATE INSPECT'N		/ /		
20087	ROCCO, INC.	2042	3	2	08	09/30/80	STATE INSPECT'N	30	08/07/80	IN COMPLIANCE	
					08	09/30/81	STATE INSPECT'N		/ /		
					08	09/30/82	STATE INSPECT'N		/ /		
20116	CHARLES W. BARGER	1422	4	3	08	09/30/80	STATE INSPECT'N	30	02/25/80	IN COMPLIANCE	
					08	09/30/81	STATE INSPECT'N		/ /		

Reproduced from best available copy.

				08	09/30/82	STATE INSPECT'N		/ /
20117	MADISON UNIVERSITY	8221 4	2	08	09/30/80	STATE INSPECT'N	30	12/17/79 IN COMPLIANCE
				08	09/30/81	STATE INSPECT'N		/ /
				08	09/30/82	STATE INSPECT'N		/ /
20119	COVINGTON, CITY OF	2951 4	2	08	09/30/80	STATE INSPECT'N	30	08/15/80 IN COMPLIANCE
				08	09/30/81	STATE INSPECT'N		/ /
				08	09/30/82	STATE INSPECT'N		/ /
20123	MOHAWK RUBBER CO	3011 3	2	08	02/28/82	STATE INSPECT'N		/ /
				08	09/30/80	STATE INSPECT'N	30	06/30/80 IN COMPLIANCE
				49	09/30/81	EPA OVR INSPECT		/ /
				08	09/30/81	STATE INSPECT'N	30	02/05/81 IN COMPLIANCE
				08	09/30/82	STATE INSPECT'N		/ /
20123	MOHAWK RUBBER CO	3011 5	2	08	09/30/82	STATE INSPECT'N		/ /
20124	VA. POLYTECH. INST.	8221 3	3	08	07/31/81	STATE INSPECT'N		/ /
				08	09/30/80	STATE INSPECT'N	30	04/28/80 IN COMPLIANCE
				08	09/30/81	STATE INSPECT'N	30	05/26/81 IN COMPLIANCE
				08	09/30/82	STATE INSPECT'N		/ /
20131	ROANOKE ELEC STEEL	3313 3	3	08	09/30/80	STATE INSPECT'N		00/00/00
				08	09/30/81	STATE INSPECT'N	30	10/02/80 IN COMPLIANCE
				08	06/09/81	STATE INSPECT'N	10	06/09/81 OUT OF COMPLIAN
				08	04/30/81	STATE INSPECT'N		/ /
				50	06/30/81	EPA INSPECTION	10	06/17/81 OUT OF COMPLIAN
				08	09/30/82	STATE INSPECT'N		/ /

20183	RUBBERMAID COM. PROD	3079	3	2	08	09/30/80	STATE INSPECT'N		00/00/00		
					08	09/30/81	STATE INSPECT'N	30	01/29/81	IN COMPLIANCE	
					08	04/23/81	STATE INSPECT'N	30	04/23/81	IN COMPLIANCE	
					08	10/31/81	STATE INSPECT'N		/ /		
					08	09/30/82	STATE INSPECT'N		/ /		
20189	AMERICAN SAFETY RAZ9	3421	3	2	08	09/30/80	STATE INSPECT'N	30	09/23/80	IN COMPLIANCE	
					08	09/30/81	STATE INSPECT'N	30	05/05/81	IN COMPLIANCE	
					08	05/31/82	STATE INSPECT'N		/ /		
					08	09/30/82	STATE INSPECT'N		/ /		
20268	C.S.MUNDY, QUARRIES	1420	3	3	08	09/30/80	STATE INSPECT'N	30	06/12/60	IN COMPLIANCE	
					08	09/30/81	STATE INSPECT'N		/ /		
					08	09/30/82	STATE INSPECT'N		/ /		
20212	SINGER	2511	4	3	08	11/31/81	STATE INSPECT'N		/ /		
					08	09/30/80	STATE INSPECT'N		/ /		
					08	09/30/81	STATE INSPECT'N	30	11/06/80	IN COMPLIANCE	
					08	09/30/82	STATE INSPECT'N		/ /		
20225	NATIONAL GYPSUM CO	3274	3	3	08	02/05/81	STATE INSPECT'N	30	02/05/81	IN COMPLIANCE	E10
					08	02/28/82	STATE INSPECT'N		/ /		
					08	04/14/81	STATE INSPECT'N	30	04/14/81	IN COMPLIANCE	
					08	04/30/82	STATE INSPECT'N		/ /		
					08	05/13/81	STATE INSPECT'N	30	05/13/81	IN COMPLIANCE	
					08	05/31/82	STATE INSPECT'N		/ /		
					08	01/05/81	STATE INSPECT'N	30	01/05/81	IN COMPLIANCE	

Reproduced from
best available copy.

```
                                                   08   01/31/82 STATE INSPECT'N        / /
                                                   08   09/30/80 STATE INSPECT'N     00/00/00
                                                   08   09/30/81 STATE INSPECT'N 30   12/06/80 IN COMPLIANCE
                                                   06   10/14/80 SOURC OP ST TES 30   10/14/80 IN COMPLIANCE
                                                   50   11/06/80 EPA INSPECTION  30   11/06/80 IN COMPLIANCE
                                                   50   09/30/80 EPA INSPECTION  30   10/14/80 IN COMPLIANCE
                                                   06   09/30/82 STATE INSPECT'N        / /
20231       LONE STAR INDUSTRIES 3241 4    1       08   09/30/80 STATE INSPECT'N        / /
20232       LONE STAR CEMENT     3241 3    3       08   02/12/81 STATE INSPECT'N 30   02/12/81 IN COMPLIANCE
                                                   08   09/30/80 STATE INSPECT'N 30   05/20/80 IN COMPLIANCE
                                                   03   03/31/82 STATE INSPECT'N        / /
                                                   08   09/30/81 STATE INSPECT'N        / /
                                                   50   05/01/81 EPA INSPECTION         / /
                                                   50   00/00/99 EPA INSPECTION         / /
                                                   08   09/30/82 STATE INSPECT'N        / /
20241       JAMISON BLACK MARBLE 1429 4    1       08   09/30/80 STATE INSPECT'N        / /
                                                   08   09/30/81 STATE INSPECT'N        / /
                                                   08   09/30/82 STATE INSPECT'N        / /
20269       BURLINGTON IND       2271 4    3       08   09/30/80 STATE INSPECT'N        / /
                                                   08   09/30/81 STATE INSPECT'N 30   02/05/81 IN COMPLIANCE
                                                   08   02/28/82 STATE INSPECT'N        / /
                                                   08   09/30/82 STATE INSPECT'N        / /
20271       BURLINGTON IND INC   2262 3    2       08   07/03/81 STATE INSPECT'N        / /
```

					08	09/30/80	STATE INSPECT'N	30	09/09/80	IN COMPLIANCE	
					08	09/30/81	STATE INSPECT'N	30	01/06/81	IN COMPLIANCE	
					08	09/30/82	STATE INSPECT'N		/ /		
20300	COLEMAN FURNITURE CO	2511	3	3	08	05/31/82	STATE INSPECT'N		/ /		E10
					08	01/31/81	STATE INSPECT'N		/ /		
					08	09/30/80	STATE INSPECT'N	30	09/25/80	IN COMPLIANCE	
					08	09/30/81	STATE INSPECT'N	30	05/20/81	IN COMPLIANCE	
					08	09/30/82	STATE INSPECT'N		/ /		
20302	OLD VIRGINIA BRICK	3251	4	1	08	09/30/80	STATE INSPECT'N		11/05/79		
					08	09/30/81	STATE INSPECT'N	30	10/06/80	IN COMPLIANCE	
					08	10/31/81	STATE INSPECT'N		/ /		
					08	09/30/82	STATE INSPECT'N		/ /		
20304	CELANESE FIBERS CO	2823	3	3	08	09/30/80	STATE INSPECT'N	30	05/15/80	IN COMPLIANCE	
					08	09/30/81	STATE INSPECT'N		/ /		
					08	05/13/81	STATE INSPECT'N	30	05/13/81	IN COMPLIANCE	
					08	05/31/82	STATE INSPECT'N		/ /		
					08	09/30/82	STATE INSPECT'N		/ /		
20320	JAMES RIV LIMESTONE	3274	3	2	08	09/30/80	STATE INSPECT'N		00/00/00		
					08	09/30/81	STATE INSPECT'N	30	12/10/80	IN COMPLIANCE	
					08	09/30/82	STATE INSPECT'N		/ /		
20321	HOOVER COLOR CORP.	2816	3	2	08	05/31/82	STATE INSPECT'N		/ /		
					08	09/30/80	STATE INSPECT'N		/ /		
					08	09/30/81	STATE INSPECT'N	30	05/20/81	IN COMPLIANCE	

```
                                          08  09/30/82 STATE INSPECT'N       / /
20322    HERCULES, INC.        2816 3   2  08  09/30/80 STATE INSPECT'N 30  07/28/80 IN COMPLIANCE
                                          08  09/30/81 STATE INSPECT'N       / /
20328    WESTVACO CORP FULP    2621 3   3  08  09/30/80 STATE INSPECT'N 30  05/12/80 IN COMPLIANCE
                                          08  09/30/81 STATE INSPECT'N       / /
                                          08  09/30/82 STATE INSPECT'N       / /
20329    WESTVACO CHEM DIV     2819 3   2  08  09/30/81 STATE INSPECT'N       / /                      E11
                                          08  09/30/80 STATE INSPECT'N 30  03/26/80 IN COMPLIANCE
                                          08  09/30/81 STATE INSPECT'N MC  05/22/81 IN COMPLIANCE
                                          08  09/30/82 STATE INSPECT'N       / /
20334    WALKER MACHN & FOUND 3321 3   2  08  09/30/80 STATE INSPECT'N     00/00/00
                                          08  09/30/81 STATE INSPECT'N 30  10/02/80 IN COMPLIANCE
                                          08  01/21/81 STATE INSPECT'N 30  01/21/81 IN COMPLIANCE
                                          08  06/30/81 STATE INSPECT'N       / /
                                          08  09/30/82 STATE INSPECT'N       / /
20337    WAYN-TEX              2824 3   2  08  09/30/80 STATE INSPECT'N 30  09/19/80 IN COMPLIANCE
                                          08  09/30/81 STATE INSPECT'N 30  05/05/81 IN COMPLIANCE
                                          08  05/31/82 STATE INSPECT'N       / /
                                          08  09/30/82 STATE INSPECT'N       / /
20340    WEBLITE CORP          3295 3   2  08  09/30/80 STATE INSPECT'N     00/00/00
                                          08  09/30/81 STATE INSPECT'N 41  02/26/81 NOT IN OPERATIO
                                          08  07/31/81 STATE INSPECT'N       / /
                                          08  07/31/82 STATE INSPECT'N       / /
                                          08   09/30/82 STATE INSPECT'N        / /
20341      VIRGINIA LINE CO     3274 3    3   08   01/05/81 STATE INSPECT'N 30   01/05/81 IN COMPLIANCE
                                          08   01/31/82 STATE INSPECT'N        / /
                                          08   04/14/81 STATE INSPECT'N 30   04/14/81 IN COMPLIANCE
                                          08   09/30/80 STATE INSPECT'N        / /
                                          08   09/30/81 STATE INSPECT'N 30   01/05/81 IN COMPLIANCE
                                          08   04/30/82 STATE INSPECT'N        / /
                                          08   01/31/82 STATE INSPECT'N        / /
                                          08   09/30/82 STATE INSPECT'N        / /
20342      GEORGIA BONUED FIBER 2200 3    2   08   09/30/80 STATE INSPECT'N 30   06/20/80 IN COMPLIANCE
                                          06   09/30/81 STATE INSPECT'N 30   05/22/81 IN COMPLIANCE
                                          08   05/31/82 STATE INSPECT'N        / /
                                          08   09/30/82 STATE INSPECT'N        / /
20381      LYNCHBURG FOUNDRY    3321 3    3   08   03/31/81 STATE INSPECT'N 30   01/09/81 IN COMPLIANCE
                                          08   01/31/82 STATE INSPECT'N        / /
                                          08   09/30/80 STATE INSPECT'N 30   06/11/80 IN COMPLIANCE
                                          49   09/30/80 EPA OVR INSPECT        / /
                                          08   09/30/81 STATE INSPECT'N 30   03/25/81 IN COMPLIANCE
                                          08   09/30/82 STATE INSPECT'N        / /
20391      PANTASOTE            3069 4    2   08   09/30/80 STATE INSPECT'N      00/00/00
                                          49   09/30/81 EPA OVR INSPECT        / /
                                          06   09/30/81 STATE INSPECT'N 30   12/30/80 IN COMPLIANCE
                                          08   09/30/82 STATE INSPECT'N        / /
```

Reproduced from
best available copy.

```
20397   SHELL OIL COMPANY    5171 3   2   08   09/30/80 STATE INSPECT'N 30   03/06/80 IN COMPLIANCE
                                          08   09/30/81 STATE INSPECT'N        / /
20411   WAYNE MFG.CO.        3442 4   1   08   09/30/80 STATE INSPECT'N        / /
                                          08   09/30/81 STATE INSPECT'N        / /
                                          08   09/30/82 STATE INSPECT'N        / /
20412   WESTERN STATE HOSP   0W61 3   2   08   09/30/80 STATE INSPECT'N 30   11/27/79 IN COMPLIANCE
                                          49   09/30/81 EPA OVR INSPECT 10   08/21/81 OUT OF COMPLIAN
                                          08   09/30/81 STATE INSPECT'N        / /
                                          08   09/30/82 STATE INSPECT'N        / /
20413   CROMPTON-SHENENDOAH  2259 3   2   08   09/30/80 STATE INSPECT'N 30   09/25/80 IN COMPLIANCE
                                          08   09/30/81 STATE INSPECT'N        / /
                                          08   09/30/82 STATE INSPECT'N        / /
20429   VA LIMESTONE CORP    1422 9   2   08   09/30/80 STATE INSPECT'N        / /
                                          08   09/30/81 STATE INSPECT'N        / /
                                          08   09/30/82 STATE INSPECT'N        / /
20431   RADFORD LIMESTONE 1  1422 3   3   08   05/31/81 STATE INSPECT'N        / /
                                          08   09/30/80 STATE INSPECT'N 30   06/24/80 IN COMPLIANCE
                                          49   09/30/80 EPA OVR INSPECT 30   06/25/80 IN COMPLIANCE
                                          08   09/30/81 STATE INSPECT'N 10   04/28/81 OUT OF COMPLIAN
                                          08   09/30/82 STATE INSPECT'N        / /
20432   RADFORD LIMESTONE 2  1422 3   2   08   05/31/81 STATE INSPECT'N        / /
                                          08   09/30/80 STATE INSPECT'N 30   05/05/80 IN COMPLIANCE
                                          08   09/30/81 STATE INSPECT'N        / /
```

```
                                                     49   09/30/81 EPA OVR INSPECT 11   08/26/81 OC SCHED REQ
                                                     08   09/30/82 STATE INSPECT'N        /  /
20433        RADFORD LIMESTONE     1446 3     2      08   09/30/80 STATE INSPECT'N      00/00/00
                                                     08   09/39/81 STATE INSPECT'N 30   12/05/80 IN COMPLIANCE
                                                     08   09/30/82 STATE INSPECT'N        /  /
20434        RADFORD LIMESTONE 3   1422 3     2      08   07/31/81 STATE INSPECT'N        /  /
                                                     08   09/30/80 STATE INSPECT'N 30   05/10/80 IN COMPLIANCE
                                                     08   02/09/81 STATE INSPECT'N 41   02/09/81 NOT IN OPERATIO
                                                     08   05/31/82 STATE INSPECT'N        /  /
                                                     08   09/30/82 STATE INSPECT'N        /  /
20435        RADFORD LIMESTONE 4   1422 3     2      08   09/30/80 STATE INSPECT'N 30   05/16/80 IN COMPLIANCE
                                                     08   09/30/81 STATE INSPECT'N        /  /
20437        HARDWOOD LUMBER CORP  2421 4     1      08   09/30/80 STATE INSPECT'N        /  /
20436        TAYLOR RAMSEY         2421 3     2      08   05/31/82 STATE INSPECT'N        /  /
                                                     08   09/30/80 STATE INSPECT'N 30   06/16/80 IN COMPLIANCE
                                                     08   09/30/81 STATE INSPECT'N 30   05/08/81 IN COMPLIANCE
20447        WEBSTER BRICK         3251 3     2      08   09/30/80 STATE INSPECT'N 30   10/18/79 IN COMPLIANCE
                                                     49   09/30/81 EPA OVR INSPECT 30   08/20/81 IN COMPLIANCE
                                                     08   09/30/81 STATE INSPECT'N        /  /
                                                     08   09/30/82 STATE INSPECT'N        /  /
20448        SOUTHERN STATES COOP  2042 3     2      08   09/30/80 STATE INSPECT'N 30   06/30/80 IN COMPLIANCE
                                                     08   09/30/81 STATE INSPECT'N        /  /
                                                     08   09/30/82 STATE INSPECT'N        /  /
```

20450	BLUE RIDGE STONE	1422	3	3	08	09/30/80 STATE INSPECT'N	30	04/22/80	IN COMPLIANCE
					08	09/30/81 STATE INSPECT'N		/ /	
					08	09/30/82 STATE INSPECT'N		/ /	
20451	HARRIS HARDWOOD CO.	2426	3	2	08	01/13/81 STATE INSPECT'N	30	01/13/81	IN COMPLIANCE
					08	06/30/81 STATE INSPECT'N		/ /	
					08	09/30/80 STATE INSPECT'N		00/00/00	
					08	09/30/81 STATE INSPECT'N	30	10/02/80	IN COMPLIANCE
					08	09/30/82 STATE INSPECT'N		/ /	
20455	ALLIED CHEM CORP	2819	9	2	08	09/30/80 STATE INSPECT'N		/ /	
					08	09/30/81 STATE INSPECT'N		/ /	
					08	09/30/82 STATE INSPECT'N		/ /	
20456	ROCKYDALE QUARRIES	1422	3	2	08	03/31/82 STATE INSPECT'N		/ /	
					08	09/30/80 STATE INSPECT'N		00/00/00	
					49	09/30/81 EPA OVR INSPECT	30	02/02/81	IN COMPLIANCE
					08	09/30/81 STATE INSPECT'N	30	12/10/80	IN COMPLIANCE
					08	09/30/82 STATE INSPECT'N		/ /	
20457	ROCKYDALE QUARRIES	3274	3	2	08	07/31/81 STATE INSPECT'N		/ /	
					08	12/31/81 STATE INSPECT'N	30	05/12/81	IN COMPLIANCE
					08	09/30/80 STATE INSPECT'N		/ /	
					08	09/30/81 STATE INSPECT'N	10	12/10/80	OUT OF COMPLIAN
					08	05/31/82 STATE INSPECT'N		/ /	
					08	09/30/82 STATE INSPECT'N		/ /	
20458	JAMES RIV LIMESTONE	3274	3	2	08	09/30/80 STATE INSPECT'N		00/00/00	

```
                                            00  09/30/81 STATE INSPECT'N 30   12/10/80 IN COMPLIANCE
                                            00  09/30/82 STATE INSPECT'N        /  /
20460      APP POWER-GLEN LYN   4911 3   3  00  09/30/80 STATE INSPECT'N 30   05/15/80 IN COMPLIANCE
                                            00  09/30/81 STATE INSPECT'N 30   05/13/81 IN COMPLIANCE
                                            00  02/28/82 STATE INSPECT'N        /  /
                                            00  01/23/81 STATE INSPECT'N 30   01/23/81 IN COMPLIANCE
                                            00  01/31/81 STATE INSPECT'N        /  /
                                            00  09/30/82 STATE INSPECT'N        /  /
20461      STATE STONE CORP     1422 3   2  00  09/30/80 STATE INSPECT'N 30   06/12/80 IN COMPLIANCE
                                            00  09/30/81 STATE INSPECT'N        /  /
                                            00  09/30/82 STATE INSPECT'N        /  /
20462      STATE STONE CORP     1422 4   1  00  09/30/80 STATE INSPECT'N        /  /
20468      NORFOLK & WESTERN    3743 4   2  00  09/30/81 STATE INSPECT'N 30   10/02/80 IN COMPLIANCE   E10
                                            50  05/22/81 EPA INSPECTION  30   06/03/81 IN COMPLIANCE
                                            00  04/30/81 STATE INSPECT'N        /  /
                                            00  09/30/82 STATE INSPECT'N        /  /
20469      RELIANCE UNIV.       2851 3   2  00  09/30/80 STATE INSPECT'N      00/00/00
                                            00  09/30/81 STATE INSPECT'N 30   10/02/80 IN COMPLIANCE
                                            00  05/13/81 STATE INSPECT'N 30   05/13/81 IN COMPLIANCE
                                            00  05/31/82 STATE INSPECT'N        /  /
                                            00  09/30/82 STATE INSPECT'N        /  /
20470      PULASKI FURNITURE    2511 4   2  00  10/31/81 STATE INSPECT'N 30   05/20/81 IN COMPLIANCE
                                            00  09/30/80 STATE INSPECT'N        /  /
```

```
                                                      08   09/30/81 STATE INSPECT'N 30   10/15/80 IN COMPLIANCE
                                                      08   05/31/82 STATE INSPECT'N        /  /
                                                      08   09/30/82 STATE INSPECT'N        /  /
20471      LONE JACK LIMESTONE  1422 3    2           08   09/30/80 STATE INSPECT'N 30   05/12/80 IN COMPLIANCE
                                                      08   09/30/81 STATE INSPECT'N        /  /
                                                      49   09/30/81 EPA OVR INSPECT 30   06/25/80 IN COMPLIANCE
                                                      08   09/30/82 STATE INSPECT'N        /  /
20477      VETERANS ADMIN. HOS. 8062 3    2           08   02/26/82 STATE INSPECT'N        /  /
                                                      08   09/30/80 STATE INSPECT'N 30   02/22/80 IN COMPLIANCE
                                                      08   09/30/81 STATE INSPECT'N 30   02/26/81 IN COMPLIANCE
                                                      08   09/30/82 STATE INSPECT'N        /  /
20480      STANLEY FURNITURE    2511 3    2           08   09/30/80 STATE INSPECT'N      00/00/00
                                                      08   09/30/81 STATE INSPECT'N 30   10/27/80 IN COMPLIANCE
                                                      08   09/30/82 STATE INSPECT'N        /  /
20482      ACCO STONE           1422 3    2           08   11/05/80 STATE INSPECT'N 30   11/05/80 IN COMPLIANCE
                                                      08   09/30/80 STATE INSPECT'N      00/00/00
                                                      08   09/30/01 STATE INSPECT'N 30   10/03/80 IN COMPLIANCE
                                                      08   11/31/81 STATE INSPECT'N        /  /
                                                      08   09/30/82 STATE INSPECT'N        /  /
20484      ADAMS CONST. CO      1422 4    2           08   10/31/82 STATE INSPECT'N        /  /
                                                      08   09/30/80 STATE INSPECT'N        /  /
                                                      08   09/30/81 STATE INSPECT'N 30   02/09/81 IN COMPLIANCE
                                                      08   04/27/81 STATE INSPECT'N 30   04/27/81 IN COMPLIANCE
```

					08	05/31/81	STATE INSPECT'N		/ /	
					08	09/30/82	STATE INSPECT'N		/ /	
20510	HERCULES	2821	3	2	08	09/30/80	STATE INSPECT'N	30	08/06/80	IN COMPLIANCE
					08	09/30/81	STATE INSPECT'N	30	05/19/81	IN COMPLIANCE
					08	05/31/82	STATE INSPECT'N		/ /	
20513	ROCKINGHAM MILLING	2042	4	2	08	01/31/82	STATE INSPECT'N		/ /	
					08	09/30/80	STATE INSPECT'N		/ /	
					08	09/30/81	STATE INSPECT'N	30	01/20/81	IN COMPLIANCE
					08	09/30/82	STATE INSPECT'N		/ /	
20515	REYNOLDS METAL CO	2821	3	2	08	09/30/80	STATE INSPECT'N	30	09/26/80	IN COMPLIANCE
					08	09/30/81	STATE INSPECT'N		/ /	
					08	09/30/82	STATE INSPECT'N		/ /	
20516	REEVES BROS VULCAN	3069	3	3	08	05/31/82	STATE INSPECT'N		/ /	
					08	09/30/80	STATE INSPECT'N	30	07/29/80	IN COMPLIANCE
					08	09/30/81	STATE INSPECT'N	30	05/06/81	IN COMPLIANCE
					08	09/30/82	STATE INSPECT'N		/ /	
26517	E.I DUPONT	2624	3	3	08	09/30/80	STATE INSPECT'N		00/00/00	
					08	09/33/81	STATE INSPECT'N	30	10/27/80	IN COMPLIANCE
					08	09/30/82	STATE INSPECT'N		/ /	
20518	VA. METALCRAFTERS	3446	3	2	08	09/30/80	STATE INSPECT'N	30	09/25/80	IN COMPLIANCE
					08	09/30/81	STATE INSPECT'N		/ /	
					08	09/30/82	STATE INSPECT'N		/ /	
20523	WELLS FURNITURE CO	2500	4	1	08	09/30/81	STATE INSPECT'N	30	01/13/81	IN COMPLIANCE

Reproduced from best available copy.

```
                                                 08   06/30/81 STATE INSPECT'N       / /
                                                 08   09/30/82 STATE INSPECT'N       / /
20524      MERCK&CO.INC,CHEM DV 2034 3    3     08   09/30/80 STATE INSPECT'N      00/00/00
                                                 08   09/30/81 STATE INSPECT'N 30   10/27/80 IN COMPLIANCE
                                                 08   09/30/82 STATE INSPECT'N       / /
20526      BLP,INC.             2295 4    2     08   02/12/82 STATE INSPECT'N       / /
                                                 08   09/30/80 STATE INSPECT'N       / /
                                                 08   09/30/81 STATE INSPECT'N 30   02/12/81 IN COMPLIANCE
                                                 08   09/30/82 STATE INSPECT'N       / /
20529      GENERAL SHALE PROD.  3251 3    2     08   04/30/82 STATE INSPECT'N       / /
                                                 08   09/30/80 STATE INSPECT'N 30   03/06/80 IN COMPLIANCE
                                                 08   09/30/81 STATE INSPECT'N 30   04/01/81 IN COMPLIANCE
                                                 08   09/30/82 STATE INSPECT'N       / /
20542      GENERAL ELECTRIC     3622 3    2     08   09/30/80 STATE INSPECT'N 30   10/12/79 IN COMPLIANCE
                                                 08   09/30/81 STATE INSPECT'N       / /
                                                 08   09/30/82 STATE INSPECT'N       / /
20544      KOPPERS CO.          2491 3    2     08   09/30/80 STATE INSPECT'N 30   11/21/79 IN COMPLIANCE
                                                 08   09/30/81 STATE INSPECT'N       / /
                                                 08   09/30/82 STATE INSPECT'N       / /
20548      ETHAN ALLEN INC      2511 3    2     08   09/30/80 STATE INSPECT'N 30   09/26/80 IN COMPLIANCE
                                                 08   09/30/81 STATE INSPECT'N       / /
                                                 08   09/30/82 STATE INSPECT'N       / /
20553      WAMPLER FOODS,INC.   2042 3    2     08   09/30/80 STATE INSPECT'N 30   09/12/80 IN COMPLIANCE
```

```
                                                    08  09/30/81 STATE INSPECT'N        / /
                                                    08  09/30/82 STATE INSPECT'N        / /
20565    LUCK QUARRY           1422 4    3          08  09/30/80 STATE INSPECT'N 30  11/30/79 IN COMPLIANCE
                                                    08  09/30/81 STATE INSPECT'N        / /
                                                    08  09/30/82 STATE INSPECT'N        / /
20569    JAMES RIV LIMESTONE   3274 4    3          08  07/31/82 STATE INSPECT'N        / /
                                                    08  09/30/80 STATE INSPECT'N        / /
                                                    08  09/30/81 STATE INSPECT'N 41  02/25/81 NOT IN OPERATIO
                                                    08  09/30/82 STATE INSPECT'N        / /
20572    GENERAL ELECTRIC      3479 4    1          08  09/30/82 STATE INSPECT'N        / /
20576    C & O RAILWAY CO.     4000 3    3          08  09/30/80 STATE INSPECT'N 30  06/17/80 IN COMPLIANCE
                                                    08  09/30/81 STATE INSPECT'N        / /
                                                    08  09/30/82 STATE INSPECT'N        / /
20590    CATAWBA HOSPITAL      8062 3    2          08  09/30/80 STATE INSPECT'N 30  10/02/79 IN COMPLIANCE
                                                    49  09/30/81 EPA OVR INSPECT 10  08/20/81 OUT OF COMPLIAN
                                                    08  09/30/81 STATE INSPECT'N        / /
                                                    08  09/30/82 STATE INSPECT'N        / /
20592    GENERAL ELECTRIC CO.  3622 4    1          08  02/27/81 STATE INSPECT'N 30  02/27/81 IN COMPLIANCE
                                                    08  02/20/82 STATE INSPECT'N        / /
                                                    08  09/30/82 STATE INSPECT'N        / /
20655    REA MAG. WIRE         3357 3    2          08  09/30/80 STATE INSPECT'N 30  06/14/80 IN COMPLIANCE
                                                    08  09/30/81 STATE INSPECT'N 30  05/08/81 IN COMPLIANCE
                                                    08  01/31/82 STATE INSPECT'N        / /
```

```
                                                 00  09/30/82 STATE INSPECT'N        / /
20656    RADFORD ARMY AMMO PT 9711 3   3   00  04/03/82 STATE INSPECT'N        / /                     E12
                                                 00  07/31/81 STATE INSPECT'N        / /
                                                 00  09/30/80 STATE INSPECT'N 30   06/10/80 IN COMPLIANCE
                                                 00  09/30/81 STATE INSPECT'N 13   01/09/81 OC EQUIP MALF
                                                 50  09/30/80 EPA INSPECTION       10/15/80
                                                 00  09/30/82 STATE INSPECT'N        / /
20675    VEPCO                4911 3   2   00  06/30/82 STATE INSPECT'N        / /
                                                 00  05/31/82 STATE INSPECT'N        / /
                                                 00  09/30/80 STATE INSPECT'N 30   09/10/80 IN COMPLIANCE
                                                 00  09/30/81 STATE INSPECT'N 41   04/20/81 NOT IN OPERATIO
20698    STAR FOUNDRY PRODUCT 3321 3   2   00  09/30/80 STATE INSPECT'N 30   09/10/80 IN COMPLIANCE
                                                 00  09/30/81 STATE INSPECT'N        / /
                                                 00  09/30/82 STATE INSPECT'N        / /
20711    MENNEL MILLING CO.   2041 3   2   00  09/30/80 STATE INSPECT'N 30   10/31/79 IN COMPLIANCE
                                                 00  09/30/81 STATE INSPECT'N        / /
                                                 00  09/30/82 STATE INSPECT'N        / /
20735    GALLIMORE PAVING CO  2951 4   2   00  09/30/80 STATE INSPECT'N 10   09/09/80 OUT OF COMPLIAN E10
                                                 00  09/30/81 STATE INSPECT'N        / /
                                                 00  09/30/82 STATE INSPECT'N        / /
20763    WOLVERINE            3293 3   2   00  09/30/80 STATE INSPECT'N 30   05/22/80 IN COMPLIANCE
                                                 00  09/30/81 STATE INSPECT'N 30   02/20/81 IN COMPLIANCE
                                                 00  02/28/82 STATE INSPECT'N        / /
```

```
                                                  08   09/30/82 STATE INSPECT'N       / /
20765      WHITE MOTOR          3713 3    2       08   09/30/80 STATE INSPECT'N      00/00/00
                                                  08   09/30/81 STATE INSPECT'N 30   10/08/80 IN COMPLIANCE
                                                  08   09/30/82 STATE INSPECT'N       / /
20771      QUALITY FEEDS, INC.  2042 4    2       08   09/30/80 STATE INSPECT'N 30   09/04/80 IN COMPLIANCE
                                                  08   09/30/81 STATE INSPECT'N       / /
                                                  08   09/30/82 STATE INSPECT'N       / /
20786      ROCKINGHAM POULTRY   2042 3    2       08   09/30/80 STATE INSPECT'N 30   06/05/80 IN COMPLIANCE
                                                  08   09/30/81 STATE INSPECT'N       / /
                                                  08   09/30/82 STATE INSPECT'N       / /
20789      PULASKI FURNTRE CORP 2511 4    2       06   09/30/80 STATE INSPECT'N      00/00/00
                                                  08   09/30/81 STATE INSPECT'N 30   12/29/80 IN COMPLIANCE
                                                  08   09/30/82 STATE INSPECT'N       / /
20794      STAUNTON LIMESTONE   1422 3    2       08   09/30/80 STATE INSPECT'N 30   03/05/80 IN COMPLIANCE
                                                  08   09/30/81 STATE INSPECT'N       / /
                                                  08   09/30/82 STATE INSPECT'N       / /
20796      SISSON & RYAN        2351 3    2       08   09/30/80 STATE INSPECT'N      00/00/00
                                                  08   09/30/81 STATE INSPECT'N 30   10/08/80 IN COMPLIANCE
20797      SISSON & RYAN        1422 3    2       08   09/30/80 STATE INSPECT'N      00/00/00
                                                  08   09/30/81 STATE INSPECT'N 30   10/08/80 IN COMPLIANCE
                                                  08   09/30/82 STATE INSPECT'N       / /
20828      VA. HOT SPRINGS      7011 3    2       08   09/30/80 STATE INSPECT'N 30   07/09/80 IN COMPLIANCE
                                                  08   09/30/81 STATE INSPECT'N 30   02/04/81 IN COMPLIANCE
```

Reproduced from
best available copy.

```
                                               08   02/28/82 STATE INSPECT'N         / /
                                               08   09/30/82 STATE INSPECT'N         / /
20878     VA LIME CO-FOOTE MIN 3274 4    1     08   01/05/81 STATE INSPECT'N 30   01/05/81 IN COMPLIANCE
                                               08   01/31/82 STATE INSPECT'N         / /
                                               08   04/14/81 STATE INSPECT'N 30   04/14/81 IN COMPLIANCE
                                               08   04/30/82 STATE INSPECT'N         / /
                                               08   01/05/81 STATE INSPECT'N 30   01/05/81 IN COMPLIANCE
                                               08   01/03/82 STATE INSPECT'N         / /
20878     VIRGINIA LIME        3295 9    2     08   09/30/80 STATE INSPECT'N      00/00/00
                                               08   09/30/81 STATE INSPECT'N         / /
                                               08   09/30/82 STATE INSPECT'N         / /
20883     L.H.SAWYER PAVING CO 2951 3    2     08   09/30/80 STATE INSPECT'N 30   09/10/80 IN COMPLIANCE
                                               08   09/30/81 STATE INSPECT'N         / /
                                               08   09/30/82 STATE INSPECT'N         / /
20911     BLACKSBURG SANI AUTH 4952 3    2     08   09/30/80 STATE INSPECT'N 30   09/23/80 IN COMPLIANCE
                                               08   09/30/81 STATE INSPECT'N         / /
                                               08   09/30/82 STATE INSPECT'N         / /
20914     ADAMS CONSTRUCTION   2951 4    2     08   09/30/81 STATE INSPECT'N 30   05/14/81 IN COMPLIANCE
                                               08   05/31/82 STATE INSPECT'N         / /
                                               08   09/30/82 STATE INSPECT'N         / /
20957     SALEM, CITY          4953 4    2     53   09/30/80 PRELIM ENG REV       10/17/79              E10
                                               53   11/15/80 PRELIM ENG REV       01/08/81
                                               08   09/30/81 STATE INSPECT'N 30   10/28/80 IN COMPLIANCE
```

```
                                                        00  05/01/81 TEST UNIT #1     30  05/06/81 IN COMPLIANCE
                                                        00  06/30/81 TEST UNIT #2         00/00/99
                                                        00  09/30/82 STATE INSPECT'N        /  /
20971          ADAMS CONSTRUCTION    2951 3     2       08  09/30/80 STATE INSPECT'N      00/00/00
                                                        49  09/30/81 EPA OVR INSPECT        /  /
                                                        08  09/30/81 STATE INSPECT'N        /  /
                                                        08  09/30/82 STATE INSPECT'N        /  /
20972          A.N. JOHNSTON         2951 4     2       08  09/30/80 STATE INSPECT'N 30   09/30/80 IN COMPLIANCE
                                                        08  09/30/81 STATE INSPECT'N        /  /
                                                        08  09/30/82 STATE INSPECT'N        /  /
20982          WEST SAND & GRAVEL    1422 3     2       08  09/30/80 STATE INSPECT'N 30   07/25/80 IN COMPLIANCE
                                                        08  09/30/81 STATE INSPECT'N        /  /
                                                        08  09/30/82 STATE INSPECT'N        /  /
20991          EXXON                 5171 4     2       08  09/30/81 STATE INSPECT'N        /  /
20995          MARATHON OIL          5171 3     2       08  09/30/80 STATE INSPECT'N 30   02/05/80 IN COMPLIANCE
                                                        08  09/30/81 STATE INSPECT'N 30   05/12/81 IN COMPLIANCE
                                                        08  05/31/82 STATE INSPECT'N        /  /

                    TOTAL NUMBER QUICK LOOK REPORT LINES       500
```

[1] CMST = compliance status

CMST value	CMDS description
0	UNKNOWN COMPL STATUS
1	IN VIOL-NO SCHEDULE
2	IN COMPL-SOURCE TEST
3	IN COMPL-INSPECTION
4	IN XOMPL-CERTIFICATN
5	IN VIOL-MEETING SCHD
6	IN VIOL-NOT MTG SCHD
7	IN VIOL-UNK WRT SCHD
8	NO APPLIC STATE REG
9	IN COMPL-SHUT DOWN

Note: If CMST is not any of the above values, "Compl Status unknown" will appear as the description.

ECAT = emission category

0 unknown
1 <100 ton/yr
2 100 to 1000 ton/yr
3 >1000 ton/yr
4 <25 ton/yr

APPENDIX C

SOURCE INSPECTION REPORT FORM

SOURCE INSPECTION REPORT

DATE ______________

SOURCE NAME ____ REGISTRATION NO. __________

LOCATION ____

PERSON CONTACTED & TITLE ____

TYPE OF VISIT

______ YEARLY INSPECTION
______ UP-DATE REGISTRATION
______ VERIFY COMPLIANCE
______ VERIFY CONTROL PROGRAM
______ VERIFY PERMIT APPLICATION
______ CHECK NEW EQUIPMENT
______ VISIBLE EMISSION EVALUATION
______ INVESTIGATE COMPLAINT
______ CHECK MALFUNCTION
______ WITNESS STACK TEST
______ DETAILED SURVEY PLANT / PROCESS
______ GENERAL WALK-THRU VISIT
______ CONSULTATION
______ CHECK SERP SCHEDULE
______ OTHER (SPECIFY IN COMMENTS)

REGISTRATION REVIEW

		NO * CHANGE	TO BE SUBMITTED	ATTACHED
	PLANT LAYOUT DIAGRAM			
E-1	GENERAL INFORMATION			
E-1, PG. 2				
E-2	FUEL BURNING EQUIPMENT			
E-2, PG. 2				
E-2, PG. 3				
E-2, PG. 4				
E-3	PROCESSING AND MANUFACTURING OPERATIONS			
E-3, PG. 2				
E-3, PG. 3				
E-3, PG. 4				
E-4	REFUSE DISPOSAL AND INCINERATION			
E-5	HYDROCARBONS STORAGE TANKS, LOADING RACKS, ETC.			
E-5, PG. 2				
E-6	GASOLINE SERVICE STATION AND HANDLING FACILITIES			

*USE NR WHEN FORM IS NOT REQUIRED OF SOURCE.

CONTROL PROGRAM (Y ______ N ______)

CONTROL PROGRAM STATUS ____

____

____

PERMIT (Y ______ N ______)

ESTIMATED COMPLETION DATE ______________. WERE THERE ANY OTHER CHANGES IN PROGRESS? Y______ N ______.

WILL THESE CHANGES NEED A PERMIT? Y ______ N ______. WAS THE REGULATION CONCERNING PERMIT PROCEDURES

DISCUSSED? Y ______ N ______. WERE PERMIT FORMS LEFT WITH CONTACT? Y ______ N ______. ARE ANY EXPANSIONS

OR PROCESS MODIFICATIONS PLANNED? ____

____

ESTIMATED START DATE? ____

CONTROL EQUIPMENT (Y ______ N ______)

WAS CONTROL EQUIPMENT OPERATING? Y ______ N ______ EFFICIENTLY? Y ______ N ______.

IF NO, WHAT CORRECTIVE MEASURES WERE DISCUSSED? ____

____

____

SAPCB Form 12
(4/25/78)

Preceding page blank

IN-STACK MONITORING EQUIPMENT (Y ____ N ____)

WAS IN-STACK MONITORING EQUIPMENT OPERATING? Y ____ N ____

IF YES, WHAT WERE THE FINDINGS? ____________________

IF NO, EXPLAIN. ____________________

VISIBLE EMISSIONS OBSERVED (Y ____ N ____)

DESCRIBE ANY VISIBLE EMISSIONS OBSERVED. ____________________

COMPLIANCE STATUS

IN COMPLIANCE ________ NOT IN COMPLIANCE ________ UNKNOWN ________

COMMENTS

INSPECTING OFFICER SIGNATURE/ DATE

REGIONAL DIRECTOR SIGNATURE/ DATE

VIRGINIA STATE AIR POLLUTION CONTROL BOARD
VISIBLE EMISSION EVALUATION RECORD

DATE ________________

COMPANY ________________ REGISTRATION NO. ________

LOCATION ________________

EMISSION POINT NAME ________________ HEIGHT TO DISCHARGE POINT ________

OBSERVER ________________ CERTIFICATION EXPIRATION DATE ________

CLOCK TIME: INITIAL ______:______ A.M./P.M. FINAL ______:______ A.M./P.M.

VISIBLE EMISSION READINGS

NO.	MIN.	SECONDS				STEAM PLUME CHECK IF APPLICABLE			NO.	MIN.	SECONDS				STEAM PLUME CHECK IF APPLICABLE		
		0	15	30	45	DET.	ATT.	COMMENT			0	15	30	45	DET.	ATT.	COMMENT
	0									30							
	1									31							
	2									32							
	3									33							
	4									34							
	5									35							
	6									36							
	7									37							
	8									38							
	9									39							
	10									40							
	11									41							
	12									42							
	13									43							
	14									44							
	15									45							
	16									46							
	17									47							
	18									48							
	19									49							
	20									50							
	21									51							
	22									52							
	23									53							
	24									54							
	25									55							
	26									56							
	27									57							
	28									58							
	29									59							

SAPCB Form 13
(3/1/75)

	INITIAL	FINAL
OBSERVER LOCATION		
DISTANCE TO DISCHARGE		
DIRECTION TO DISCHARGE		
HEIGHT OF OBSERVATION POINT		
BACKGROUND DESCRIPTION		
WEATHER CONDITIONS		
WIND DIRECTION		
WIND SPEED		
AMBIENT TEMPERATURE		
SKY CONDITIONS		
PLUME DESCRIPTION		
COLOR		
DISTANCE VISIBLE		

DIAGRAM OF OBSERVER AND EMISSION POINT

COMMENTS

OBSERVER SIGNATURE

REGION DIRECTOR SIGNATURE

APPENDIX D

EXAMPLE OF INSPECTION REPORTS COMPLETED PRIOR TO THE STUDY

SOURCE INSPECTION REPORT

DATE 9-14-81

SOURCE NAME Roanoke Electric Steel REGISTRATION NO. 20131

LOCATION Roanoke Va

PERSON CONTACTED & TITLE Jim Olson Jr - Melt Shop Foreman

TYPE OF VISIT

Quarterly
✓ ROUTINE INSPECTION
____ UP-DATE REGISTRATION
____ VERIFY COMPLIANCE
____ VERIFY CONTROL PROGRAM
____ VERIFY PERMIT APPLICATION
____ CHECK NEW EQUIPMENT
✓ VISIBLE EMISSION EVALUATION
____ INVESTIGATE COMPLAINT
____ CHECK MALFUNCTION
____ WITNESS STACK TEST
____ DETAILED SURVEY PLANT / PROCESS
____ GENERAL WALK-THRU VISIT
____ CONSULTATION
____ CHECK SERP SCHEDULE
____ OTHER (SPECIFY IN COMMENTS)

REGISTRATION REVIEW

		NO* CHANGE	TO BE SUBMITTED	ATTACHED
	PLANT LAYOUT DIAGRAM	↓		
E-1	GENERAL INFORMATION	↓		
E-1, PG. 2		↓		
E-2	FUEL BURNING EQUIPMENT	↓		
E-2, PG. 2		↓		
E-2, PG. 3		↓		
E-2, PG. 4		↓		
E-3	PROCESSING AND MANUFACTURING OPERATIONS	↓		
E-3, PG. 2		↓		
E-3, PG. 3		↓		
E-3, PG. 4		↓		
E-4	REFUSE DISPOSAL AND INCINERATION	↓		
E-5	HYDROCARBONS STORAGE TANKS, LOADING RACKS, ETC.	↓		
E-5, PG. 2		↓		
E-6	GASOLINE SERVICE STATION AND HANDLING FACILITIES	↓		

*USE NR WHEN FORM IS NOT REQUIRED OF SOURCE.

CONTROL PROGRAM (Y ____ N ✓)

CONTROL PROGRAM STATUS ____

PERMIT (Y ✓ N ____)

ESTIMATED COMPLETION DATE Aug 82. WERE THERE ANY OTHER CHANGES IN PROGRESS? Y ____ N ✓.

WILL THESE CHANGES NEED A PERMIT? Y ____ N ✓. WAS THE REGULATION CONCERNING PERMIT PROCEDURES DISCUSSED? Y ____ N ✓. WERE PERMIT FORMS LEFT WITH CONTACT? Y ____ N ✓. ARE ANY EXPANSIONS OR PROCESS MODIFICATIONS PLANNED? ____

ESTIMATED START DATE? ____

CONTROL EQUIPMENT (Y ✓ N ____)

WAS CONTROL EQUIPMENT OPERATING? Y ✓ N ____ EFFICIENTLY? Y ____ N ✓.

IF NO, WHAT CORRECTIVE MEASURES WERE DISCUSSED? See Comments

SAPCB Form 12
(4/26/78)

Preceding page blank

IN-STACK MONITORING EQUIPMENT (Y ____ N ✓)

WAS IN-STACK MONITORING EQUIPMENT OPERATING: Y ____ N ____

IF YES, WHAT WERE THE FINDINGS? ____

IF NO, EXPLAIN. ____

VISIBLE EMISSIONS OBSERVED (Y ✓ N ____)

DESCRIBE ANY VISIBLE EMISSIONS OBSERVED. ____

COMPLIANCE STATUS

IN COMPLIANCE ____ NOT IN COMPLIANCE ✓ UNKNOWN ____

COMMENTS

INSPECTING OFFICER SIGNATURE/ DATE

REGIONAL DIRECTOR SIGNATURE/ DATE

SOURCE INSPECTION REPORT

DATE 5-22-81

SOURCE NAME Westvaco Carbon Plant REGISTRATION NO. 20329

LOCATION Covington Va

PERSON CONTACTED & TITLE Tom Baskins - Engineer

TYPE OF VISIT

✓ Quarterly INSPECTION
___ UP-DATE REGISTRATION
___ VERIFY COMPLIANCE
___ VERIFY CONTROL PROGRAM
___ VERIFY PERMIT APPLICATION
___ CHECK NEW EQUIPMENT
___ VISIBLE EMISSION EVALUATION
___ INVESTIGATE COMPLAINT
___ CHECK MALFUNCTION
___ WITNESS STACK TEST
___ DETAILED SURVEY PLANT / PROCESS
___ GENERAL WALK-THRU VISIT
___ CONSULTATION
___ CHECK SERP SCHEDULE
___ OTHER (SPECIFY IN COMMENTS)

REGISTRATION REVIEW

		NO * CHANGE	TO BE SUBMITTED	ATTACHED
	PLANT LAYOUT DIAGRAM	↓		
E-1	GENERAL INFORMATION			
E-1, PG. 2				
E-2	FUEL BURNING EQUIPMENT			
E-2, PG. 2				
E-2, PG. 3				
E-2, PG. 4				
E-3	PROCESSING AND MANUFACTURING OPERATIONS			
E-3, PG. 2				
E-3, PG. 3				
E-3, PG. 4				
E-4	REFUSE DISPOSAL AND INCINERATION			
E-5	HYDROCARBONS STORAGE TANKS, LOADING RACKS, ETC.			
E-5, PG. 2				
E-6	GASOLINE SERVICE STATION AND HANDLING FACILITIES			

*USE NR WHEN FORM IS NOT REQUIRED OF SOURCE.

CONTROL PROGRAM (Y ___ N ✓)

CONTROL PROGRAM STATUS ___

PERMIT (Y ___ N ✓)

ESTIMATED COMPLETION DATE ___. WERE THERE ANY OTHER CHANGES IN PROGRESS? Y ___ N ✓

WILL THESE CHANGES NEED A PERMIT? Y ___ N ✓ WAS THE REGULATION CONCERNING PERMIT PROCEDURES DISCUSSED? Y ___ N ✓ WERE PERMIT FORMS LEFT WITH CONTACT? Y ___ N ✓ ARE ANY EXPANSIONS OR PROCESS MODIFICATIONS PLANNED? ___

ESTIMATED START DATE? ___

CONTROL EQUIPMENT (Y ✓ N ___)

WAS CONTROL EQUIPMENT OPERATING? Y ✓ N ___ EFFICIENTLY? Y ✓ N ___.

IF NO, WHAT CORRECTIVE MEASURES WERE DISCUSSED? ___

SAPCB Form 12
(4/28/76)

IN-STACK MONITORING EQUIPMENT (Y ___ N ✓)

WAS IN-STACK MONITORING EQUIPMENT OPERATING: Y ___ N ___

IF YES, WHAT WERE THE FINDINGS? ___

IF NO, EXPLAIN. ___

VISIBLE EMISSIONS OBSERVED (Y ✓ N ___)

DESCRIBE ANY VISIBLE EMISSIONS OBSERVED. See Comments

COMPLIANCE STATUS

IN COMPLIANCE ✓ NOT IN COMPLIANCE ___ UNKNOWN ___

COMMENTS

INSPECTING OFFICER SIGNATURE/ DATE

REGIONAL DIRECTOR SIGNATURE/ DATE

Reproduced from best available copy.

④ Carbon Regeneration - Not operating this visit

⑤ Granular Wash controls - High energy venturi scrubber and Micro Pul baghouse - emissions 0% opacity.

Powdered Carbon Plant

① #1 Kiln - controls - Bag filter emissions 0% opacity

② carbon finishing controls Bag filter Plant Section NOT In USE.

* ③ No 2 Kiln Scrubber - controls Venturi Scrubber Pressure drop across scrubber NOT operating this visit. I was advised me that gauge was stopped up. I requested that the gauge be repaired at once. emissions 50% opacity approx.

* ④ No 3 Kiln Scrubber - controls Venturi Scrubber Pressure drop - 51 inches - emissions 50% opacity approx.

No changes are planned at any of the above listed plants.. The carbon plants were in compliance during this inspection

RW Saunders

SOURCE INSPECTION REPORT

DATE 2-5-81

SOURCE NAME National Gypsum Co. REGISTRATION NO. 20225

LOCATION Erie

PERSON CONTACTED & TITLE Mr. Ted Hauman Plant Manager
Mr. W.A. Johnston Plant Foreman

TYPE OF VISIT

- ✓ ~~YEARLY~~ monthly INSPECTION
- ___ UPDATE REGISTRATION
- ___ VERIFY COMPLIANCE
- ___ VERIFY CONTROL PROGRAM
- ___ VERIFY PERMIT APPLICATION
- ___ CHECK NEW EQUIPMENT
- ✓ VISIBLE EMISSION EVALUATION
- ___ INVESTIGATE COMPLAINT
- ___ CHECK MALFUNCTION
- ___ WITNESS STACK TEST
- ✓ DETAILED SURVEY PLANT / PROCESS
- ___ GENERAL WALK-THRU VISIT
- ✓ CONSULTATION
- ___ CHECK SERP SCHEDULE
- ✓ OTHER (SPECIFY IN COMMENTS)

REGISTRATION REVIEW

		NO* CHANGE	TO BE SUBMITTED	ATTACHED
	PLANT LAYOUT DIAGRAM	|		
E-1	GENERAL INFORMATION	|		
E-1, PG. 2		|		
E-2	FUEL BURNING EQUIPMENT	|		
E-2, PG. 2		|		
E-2, PG. 3		|		
E-2, PG. 4		|		
E-3	PROCESSING AND MANUFACTURING OPERATIONS	|		
E-3, PG. 2		|		
E-3, PG. 3		|		
E-3, PG. 4		|		
E-4	REFUSE DISPOSAL AND INCINERATION	|		
E-5	HYDROCARBONS STORAGE TANKS, LOADING RACKS, ETC.	|		
E-5, PG. 2		|		
E-6	GASOLINE SERVICE STATION AND HANDLING FACILITIES	|		

*USE NR WHEN FORM IS NOT REQUIRED OF SOURCE.

CONTROL PROGRAM (Y ___ N ✓)

CONTROL PROGRAM STATUS ___

PERMIT (Y ___ N ✓)

ESTIMATED COMPLETION DATE ___. WERE THERE ANY OTHER CHANGES IN PROGRESS? Y ___ N ___

WILL THESE CHANGES NEED A PERMIT? Y ___ N ___. WAS THE REGULATION CONCERNING PERMIT PROCEDURES

DISCUSSED? Y ___ N ___. WERE PERMIT FORMS LEFT WITH CONTACT? Y ___ N ___. ARE ANY EXPANSIONS

OR PROCESS MODIFICATIONS PLANNED? ___

ESTIMATED START DATE? ___

CONTROL EQUIPMENT (Y ✓ N ___)

WAS CONTROL EQUIPMENT OPERATING? Y ✓ N ___ EFFICIENTLY? Y ✓ N ___

IF NO, WHAT CORRECTIVE MEASURES WERE DISCUSSED? Kiln Baghouse: Emissions - marginal

SAPCB Form 12

IN-STACK MONITORING EQUIPMENT (Y ___ N ✓)

WAS IN-STACK MONITORING EQUIPMENT OPERATING: Y ___ N ___

IF YES, WHAT WERE THE FINDINGS? ___

IF NO, EXPLAIN. ___

VISIBLE EMISSIONS OBSERVED (Y ✓ N ___)

DESCRIBE ANY VISIBLE EMISSIONS OBSERVED. Raymond's emissions when #2 kiln is operating are marginal

COMPLIANCE STATUS

IN COMPLIANCE ✓ NOT IN COMPLIANCE ___ UNKNOWN ___

COMMENTS

① Raymond VE = ~20% - Don't [illegible] on 10 bed- grand depth according to R.H. Johnston is variable from compartment to compartment. ~95° Cleaning cycle & auto schedule remain the same. Oxygen Analyzer = 1.5% Kiln #2 was in operation ... Ted Hayman is suggesting that the reason for the marginal emissions on the Raymond Unit, when Kiln #2 is in operation is due to the elbow in the coal feed pipe (vs Kiln #1 which has a straight- (no elbow) pipe feed). The elbow is suggested to create drag and possible coal feed variations (and accounting for Ringlemann shade variation). Plan to straighten the feed pipe ...

② #3 Baghouse - Satisfactory this date... advised Mr. Johnston of one compartment needing more attention ... stated that he will have the two men who work on the Baghouse daily - take a look at said compartment.

INSPECTING OFFICER SIGNATURE/ DATE

③ Mixing Floor & below floor mixers - well controlled - no excessive fugitive dust. Control = proper operating procedures.

④ Hydrate Plant - good housekeeping.

⑤ Plant's Open areas ... visit after rain ... suggest snow shoes as safety gear.

REGIONAL DIRECTOR SIGNATURE/ DATE

[illegible] C. Moore
6-8-81

Reproduced from best available copy.

#7

VIRGINIA STATE AIR POLLUTION CONTROL BOARD
VISIBLE EMISSION EVALUATION RECORD

DATE 6-5-81

COMPANY National Gypsum Co. REGISTRATION NO. 20235

LOCATION Gile

EMISSION POINT NAME Ground Unit - Stack HEIGHT TO DISCHARGE POINT

OBSERVER Richard C Moore CERTIFICATION EXPIRATION DATE 10-31-81

CLOCK TIME: INITIAL 11 52 : 1 3 4 [✓ A.M.] P.M. FINAL 11 59 : 1 40 A.M. [✓ P.M.]

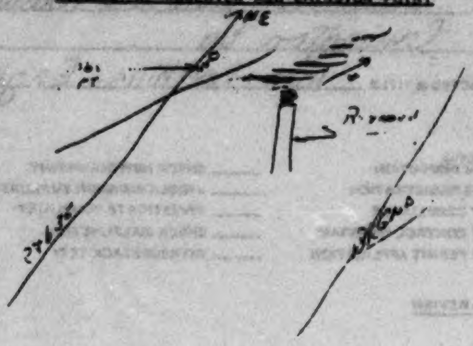
VISIBLE EMISSION READINGS

HR.	MIN.	SECONDS				STEAM PLUME (CHECK IF APPLICABLE)			HR.	MIN.	SECONDS				STEAM PLUME (CHECK IF APPLICABLE)		
		0	15	30	45	DET.	ATT.	COMMENT			0	15	30	45	DET.	ATT.	COMMENT
	0									30							
	1									31							
11:52	2			25	20					32							
	3	25	25	25	20					33							
	4	25	–	25	25				'34	34	20	25	20	15			
	5	20	20	15	25					35	20	20	20	20			
	6	–	25	–	20					36	15	20	20	20			
	7	20	20	20	25					37	15	–	20	25			
	8	25	25	-	25					38	25	20	25	20			8°1'
	9	25	25							39	15	20	15	–			
	10									40	–	–	20	20			
	11									41							
	12									42							
	13									43							
	14									44							
	15									45							
	16									46							
	17									47							
	18									48							
	19									49							
	20									50							
	21									51							
	22									52							
	23									53							
	24									54							
	25									55							
	26									56							
	27									57							
	28									58							
	29									59							

SAPCB Form 13
(3/1/73)

	INITIAL	FINAL
OBSERVER LOCATION		
DISTANCE TO DISCHARGE	100 yds	-
DIRECTION TO DISCHARGE	SE	-
HEIGHT OF OBSERVATION POINT	grd	-
BACKGROUND DESCRIPTION		
Tree line [illegible]		-
WEATHER CONDITIONS		
WIND DIRECTION	SW	-
WIND SPEED mph	~1-2	-
AMBIENT TEMPERATURE °F	~80	-
SKY CONDITIONS		
25% cldy	-	-
PLUME DESCRIPTION		
COLOR	gray/white	-
DISTANCE VISIBLE	~50'	-

DIAGRAM OF OBSERVER AND EMISSION POINT



O = Sun (overhead)

COMMENTS

* Plume rise - then trail off to NE

OBSERVER SIGNATURE

REGION DIRECTOR SIGNATURE

SOURCE INSPECTION REPORT

DATE 5-28-81

SOURCE NAME Westvaco Bleached Board Division REGISTRATION NO. 20328

LOCATION Covington Va

PERSON CONTACTED & TITLE Tom Rodkins. Engineer

TYPE OF VISIT

✓ [illegible] ROUTINE INSPECTION
___ UP-DATE REGISTRATION
___ VERIFY COMPLIANCE
___ VERIFY CONTROL PROGRAM
___ VERIFY PERMIT APPLICATION
___ CHECK NEW EQUIPMENT
___ VISIBLE EMISSION EVALUATION
___ INVESTIGATE COMPLAINT
___ CHECK MALFUNCTION
___ WITNESS STACK TEST
___ DETAILED SURVEY PLANT / PROCESS
___ GENERAL WALK-THRU VISIT
___ CONSULTATION
___ CHECK SERP SCHEDULE
___ OTHER (SPECIFY IN COMMENTS)

REGISTRATION REVIEW

		NO* CHANGE	TO BE SUBMITTED	ATTACHED
	PLANT LAYOUT DIAGRAM	✓		
E-1	GENERAL INFORMATION	✓		
E-1, PG. 2		✓		
E-2	FUEL BURNING EQUIPMENT	✓		
E-2, PG. 2		✓		
E-2, PG. 3		✓		
E-2, PG. 4		✓		
E-3	PROCESSING AND MANUFACTURING OPERATIONS	✓		
E-3, PG. 2		✓		
E-3, PG. 3		✓		
E-3, PG. 4		✓		
E-4	REFUSE DISPOSAL AND INCINERATION	✓		
E-5	HYDROCARBONS STORAGE TANKS, LOADING RACKS, ETC.	✓		
E-5, PG. 2		✓		
E-6	GASOLINE SERVICE STATION AND HANDLING FACILITIES	✓		

*USE NR WHEN FORM IS NOT REQUIRED OF SOURCE.

CONTROL PROGRAM (Y ___ N ✓)

CONTROL PROGRAM STATUS ___

PERMIT (Y ___ N ✓)

ESTIMATED COMPLETION DATE ___. WERE THERE ANY OTHER CHANGES IN PROGRESS? Y ___ N ✓. WILL THESE CHANGES NEED A PERMIT? Y ___ N ✓. WAS THE REGULATION CONCERNING PERMIT PROCEDURES DISCUSSED? Y ___ N ✓. WERE PERMIT FORMS LEFT WITH CONTACT? Y ___ N ✓. ARE ANY EXPANSIONS OR PROCESS MODIFICATIONS PLANNED? ___

ESTIMATED START DATE? ___

CONTROL EQUIPMENT (Y ✓ N ___)

WAS CONTROL EQUIPMENT OPERATING? Y ✓ N ___ EFFICIENTLY? Y ✓ N ___

IF NO, WHAT CORRECTIVE MEASURES WERE DISCUSSED? ___

SAPCB Form 12
(6/20/38)

IN-STACK MONITORING EQUIPMENT (Y ✓ N ___)

WAS IN-STACK MONITORING EQUIPMENT OPERATING? Y ___ N ✓

IF YES, WHAT WERE THE FINDINGS? ___

IF NO, EXPLAIN. Turned off until repairs can be made and believable readings can be made.

VISIBLE EMISSIONS OBSERVED (Y ✓ N ___)

DESCRIBE ANY VISIBLE EMISSIONS OBSERVED. See Comments

COMPLIANCE STATUS

IN COMPLIANCE ✓ NOT IN COMPLIANCE ___ UNKNOWN ___

COMMENTS

INSPECTING OFFICER SIGNATURE/ DATE

REGIONAL DIRECTOR SIGNATURE/ DATE

See Attached

Reproduced from best available copy.

⑤ Power Plant

→ No. 6 Boiler (arcing [illegible] noted from probably [illegible] due to rapid load change) controls – Research Cottrell Electrostatic Precip. – field voltage – unknown this visit – fuel – woodwaste + coal – emissions (VEE for 30 minutes) 0-10% opacity.

→ No 7 Boiler controls – Multicyclone, UOP Electrostatic Precipitator fuel – woodwaste + coal field voltage unknown this visit – emissions (VEE for 30 minutes) test run only – 0% opacity

→ No 8 Boiler controls multicyclone, UOP Electrostatic Precipitator fuel – woodwaste + coal field voltage unknown this visit – emissions (VEE for 30 minutes) test run only – 0% opacity

→ No 9 Boiler · controls · Koppers Electrostatic Precipitator fuel – woodwaste + coal – field voltage – unknown this visit emissions (VEE for 30 minutes) test run only – 0% opacity.

No 10 Boiler controls – None – Unit not on line.

Summary: On this date the paper mill was operating normally and visible emissions were well within air limits. No major problems were observed and odors did not appear (smell) that bad.

R.W. Saunders – 5-28-81

APPENDIX E

AGENDA FOR ROANOKE CLASSROOM INSTRUCTION

ROANOKE PLANT INSPECTION WORKSHOP

AGENDA

Location:

Thrifty Inn
Roanoke, Virginia

Date:

October 13-15, 1981

Day & Time	Topic	Speaker
TUESDAY		
8:30	Introduction	R. Hawks
9:00	Purpose and Scope	R. Hawks
	SESSION I. PLANT INSPECTION TECHNIQUES	
9:15	Comprehensive Inspection Techniques	G. Saunders
9:45	Baseline Assessment and Stack Test Observation	S. Schliesser
10:30	BREAK	
10:45	Fans and Ventilation Systems	G. Saunders
12:00	LUNCH	
	SESSION II. EVALUATION OF CONTROL EQUIPMENT	
1:00	Mechanicals	R. Hawks
3:00	BREAK	
3:30	Wet Scrubbers	G. Saunders
5:00	ADJOURNMENT	

Preceding page blank

AGENDA (continued)

Day & Time	Topic	Speaker
WEDNESDAY		
8:30	ESP's	S. Schliesser
10:00	BREAK	
10:30	ESP's (continued)	S. Schliesser
11:30	LUNCH	
1:00	Fabric Filters	R. Hawks
3:00	BREAK	
3:30	Opacity	G. Saunders
4:30	ADJOURNMENT	
THURSDAY		
	SESSION III. INDUSTRIAL SOURCE CATEGORIES	
8:30	Industrial Boilers	G. Saunders
10:00	BREAK	
10:30	Cement	R. Hawks
12:00	LUNCH	
1:00	Kraft Pulp	R. Hawks
2:00	Safety	
3:00	BREAK	
3:30	Test	

APPENDIX F

WORKSHOP EXAMINATION

PLANT INSPECTION WORKSHOP EXAMINATION

Baghouses

1) Name the three major components of any baghouse?

2) What are the four major mechanisms of particulate capture on a fiber?

3) What are the three types of baghouses as defined by cleaning method?

4) Name the two types of filter media used in baghouses and describe the structure.

5) What are the most common problems which interfere with cake release?

6) What are the four mechanisms by which fabrics fail?

Preceding page blank

7) Why are inertia classifiers and precleaners (mechanical collectors) used in baghouses?

8) Why is insulation required on baghouses serving "hot" sources?

9) At what point on bags do most failures occur? Why?

10) Why is bag tension important in maintaining bag life?

11) What is the optimum compressed air pressure required in a typical pulse jet baghouse?

12) How can cyclic visible puffs be used to determine bag failure in pulse jet baghouses?

13) What are the three types of fiber materials commonly used in baghouses?

14) Why is a finish used on fiberglass bags?

15) Why do bags lose strength when exposed to high temperature and chemicals?

16) Why are long tube sheet thimbles important in reducing bag failures?

17) Baghouse Problem:

Given: A baghouse contains 400 fiberglass bags which are 6 inches in diameter and 10 feet long. The design gas volume through the collector is 12,000 acfm at a pressure drop of 4 in H_2O. The baghouse contains two compartments with reverse air cleaning.

a) What is the cloth area in the baghouse?

b) What is the air to cloth ratio at design conditions?

c) If the static pressure drop of the baghouse increases, what happens to the gas volume?

d) If the static pressure drop of the baghouse decreases, what happens to the gas volume?

e) What is the maximum temperature at which the baghouse should be operated?

Mechanical Collectors

1) What is the basic collection principal of mechanical collectors?

2) What is the upper inlet velocity limit for a typical simple cyclone?

3) What is the reason for using multiple cyclone tubes?

4) What are the variables that affect multicyclone pressure drop?

5) What are the major pluggage mechanisms in a multicyclone?

6) What is the maximum normal pressure drop for multicyclone?

7) Where is the pressure drop developed in a multicyclone?

8) What is the effect on pressure drop if multicyclone gas volume is increased?

9) What affect does hopper inleakage have on cyclone performance?

10) How does hopper evacuation increase multicyclone efficiency?

11) How often should an internal inspection be conducted on a multicyclone?

12) Where does wear occur in a simple cyclone?

13) Mechanical Collector Problem:

Given: A multicyclone collector has 200 tubes and is operated at a design gas volume of 75,000 acfm (350°F). The tubes are 6 inches in diameter and have an inlet area of 0.125 ft^2.

a) What is the theoretical pressure drop of the collector if K = 12.67?

b) What is the gas volume handled by each tube?

c) What is the inlet velocity of each cyclone tube?

d) If the gas volume is increased by 50% (112,500 acfm) what is the cyclone pressure drop? What is the inlet velocity?

e) If at the above stated given conditions the collector has an efficiency of 85%, what happens to the efficiency as pressure drop is increased (increased gas volume)?

Scrubbers

1) In the analysis of the performance of a fixed-throat venturi scrubber the following measurements are performed: gas temperature, inlet and outlet static pressure at the venturi, gas volume (determined from fan operation or pitot traverses), and liquid flow rate to the scrubber throat. If these values are known, circle the key operating parameters that may be determined.

   a) Venturi pressure drop
   b) Liquid/gas ratio
   c) Throat velocity
   d)

2) What are the two major collection mechanisms at work in a venturi scrubber? Which is the dominant mechanism (please circle)? List the particle size ranges collected by these mechanisms.

3) Is opacity, or a change in opacity level, generally a good indicator of venturi scrubber performance?

4) The scrubber is part of an entire set of components including pumps, fans, and settling pond. What piece of equipment is required to efficiently collect the particulate other than the scrubber body itself?

5) What two conditions may require the use of a presaturator prior to the scrubber?

   a) High dissolved solids in the scrubber water.
   b) Low water temperature.
   c) Low gas temperature.
   d) Volatile, condensible material in the gas stream.
   e) Damage to fabric in the scrubber.
   f) High gas temperature.

6) What is the key parameter that indicates venturi scrubber performance?

7) Does a high suspended solid content contribute to nozzle erosion or nozzle pluggage (Yes or No)?

8) When a nozzle becomes plugged, does it typically affect water distribution in the scrubber throat?

9) What affect, if any, does a plugged nozzle have on pressure drop?

10) A decrease in liquid-to-gas ratio (L/G) typically does the following:

    a) decrease the efficiency
    b) has no effect on performance
    c) increases the efficiency

11) Indicate the proper operating range for dissolved solids.

12) If high dissolved solids are suspected as a problem at a high temperature source and clear make-up water is added to the system to maintain water volume in the entire system and compensate for evaporation losses, where should this water be added to minimize problems?

    a) at the scrubber throat
    b) at the presaturator
    c) at the sump
    d) at the water fountain in the control room

13) Does the pressure gauge on the water supply header indicate flow of water to the scrubber?

14) What is the typical range of throat velocities (in cm/s) used to design venturi scrubbers?

15) What is the typical range of L/G ratios for venturi scrubber?

16) Is a 2 inch, H_2O change of pressure drop more significant in a low pressure or high pressure venturi?

17) What three changes in operation or design may be incorporated to prevent scrubber freezing?

18) Should fresh water be used to clean non-cyclonic demisters? Why?

19) What is the maximum velocity acceptable for non-cyclonic demisters?

20) What range of turn-down ratio is acceptable for a cyclonic separator from the design value (express as a percentage of design volume)?

21) Scrubber problem:

A scrubber is used to control a small industrial source. The inlet gas temperature to a presaturator is 350°F (this is the inlet temperature to the scrubber). Static pressure at the scrubber inlet is -3.0 inches H_2O. The gas passes through the scrubber and the conditions at the scrubber exit are -28 inches H_2O static pressure at 175°F. Water flow to the scrubber is 300 gal/min and gas flow at the scrubber inlet is 22,000 acfm. After passing through the scrubber the gas is ducted through a cyclonic separator with an outlet pressure of -31 inches H_2O. Assuming the throat area is 0.75 ft^2 determine the following:

a) Scrubber pressure drop
b) Scrubber throat velocity
c) Scrubber L/G ratio
d) Cyclonic separator ΔP
e) Is the prosaturator functioning properly?

Fan

1) What two parameters must be measured to use fan tables?

2) What two parameters are "optional" so that only one of the two are necessary to complete fan calculations?

3) For any given radial blade fan operating at a constant rpm, what is the effect of a decrease of static pressure across the fan on gas volume and horsepower?

4) A decrease in fan rpm causes a shift in fan curve. Does this decrease go towards or away from the "origin" of the fan curve?

5) Which fan type is most commonly applied to industrial gas moving applications?

6) A decrease in gas temperature at a fan will (at fixed rpm):

a) increase horsepower requirements
b) decrease horsepower requirements
c) not affect horsepower requirements

7) An increase in gas temperature at fixed rpm will:

a) increase measured static pressure
b) decrease measured static pressure
c) not change the measured static pressure

8) A temperature correction must be applied to correct for gas density differences between actual density and the density of gas for the fan table. What is the standardized temperature for most fan tables?

9) Does measured rpm have to be corrected for a) temperature, b) static pressure, and c) horsepower?

a)
b)
c)

10) Once the volume is obtained from fan tables or a fan curve, must the volume be corrected back to the measured temperature?

11) **Fan Problem:**

Given the following information on fan operating parameters calculate the gas volume moved through a Zurn 229XL open wheel fan. Gas temperature: 440°F, fan speed 1000 rpm, static pressure drop across fan: 7.1 inches H_2O, approximate BHP: 45 hp. Assume altitude is approximately sea level.

a) Gas volume = ________________ acfm

b) If the fan speed is increased to 1225 rpm what are the new values for (you may use either from table or fan laws):

a) Gas volume
b) Static pressure
c) Fan BHP

c) Would a 100-hp motor be adequate for this application?

F-Factors

1) An F-factor may be developed for each fuel type to determine gas volume produced upon combustion. Under what conditions (i.e., percent excess air) is an F-factor determined?

2) What is the formula for determining excess air from oxygen in the stack? Use this formula to determine the percent excess air for a measurement of 6.0 percent oxygen.

3) Percent excess air may be determined by either CO_2 or O_2 measurements. Which measurement is preferred and why?

4) A boiler is fed 10,000 lb of coal/h. The heat content of the coal is 11,750 BTU/lb. Measured oxygen content is 2.5 percent and gas temperature is 420°F. Under these conditions, what would the expected gas volume be?

ESP

1) What are the two major components within an ESP responsible for charging and collecting the particulate?

2) What are the components which remove particulate from the internal surfaces of the ESP?

3) What is the component that provides power to the ESP?

4) In what section would you expect a space-charge "effect" or corona quench?

a) Inlet scetion
b) Middle section
c) Outlet section

5) In what area of the ESP would you expect most of the particulate material to be collected?

a) Inlet section
b) Middle section
c) Outlet section

6) What conditions would you look for if you suspected secondary power leakage?

a) Moist insulators
b) Dirty insulators
c) Cracked insulators
d) a, b, and c

7) What secondary voltage range would be expected in a high efficiency ESP?

a) 100 to 300 volts
b) 1000 to 1500 volts
c) 10,000 to 12,000 volts
d) 30,000 to 40,000 volts
e) 400,000 to 500,000 volts

8) Which of the following typically indicate improved ESP performance?

- a) Higher SCA
- b) Higher superficial velocity
- c) High gas volume
- d) More T-R's for greater sectionalization
- e) Higher power input
- f) ESP aspect ratios greater than 1.0

9) What is the electrical indicator of ESP collection efficiency?

10) What resistivity range provides the best ESP performance?

- a) 10^7 to 10^8 ohm-cm
- b) 10^8 to 10^{10} ohm-cm
- c) 10^{11} to 10^{13} ohm-cm
- d) none of the above

11) What is the typical spacing between the collecting plates in an ESP?

- a) 9 to 10 inches
- b) 4 to 5 inches
- c) about 1 foot
- d) none of above

12) What section of a well-operated ESP would experience the highest secondary current level?

- a) inlet section
- b) middle section
- c) outlet section

13) If 20 percent more gas volume is being treated by an ESP with the same power input level, what is most likely to occur?

- a) less emissions
- b) more emissions
- c) same emissions

14) If a T-R set is not operating, what is the most likely cause of the problem?

- a) insufficient instrumentation
- b) wire breakage causing a short
- c) high resistivity
- d) excessive gas throughput

15) **ESP Problem**

Using the given information calculate values for:

1) superficial gas velocity
2) corona power
3) specific corona power
4) penetration

Given Information

Gas Volume = 900,000 acfm @ 330°F
Cross-sectional Area = 2143 ft^2
K = 0.50
T-R set efficiency = 0.70

Field	Primary Voltage	Primary Current
1	340	90
2	330	105
3	315	125
4	290	160
5	295	195

a. Calculate superficial Gas Velocity in ft/min and ft/s.

b. Calculate CORONA POWER in WATTS

c. Calculate SPECIFIC CORONA POWER in WATTS/1000 acfm.

d. Calculate PENETRATION in PERCENT.

APPENDIX G

EQUIPMENT CHECK LIST

EQUIPMENT CHECK-OFF LIST

SOURCE NAME ______________________________

LOCATION ______________________ PN ______________

RO II PERSONNEL INVOLVED ______________________________

____

____

INSTRUMENTS

_____ Camera

_____ BioMarine O_2 meter

_____ O_2 meter calibration gas

_____ Pitot tube #1 (5/16" x 36")

_____ Pitot tube #2 (5/16" x 36")

_____ S-type pitot tube

_____ Magnehelic set #1 (3 gauges)

_____ Magnehelic set #2 (3 gauges)

_____ 0-2 in. magnehelic gauge

_____ 36" manometer

_____ Dwyer inclined manometer

_____ Fisher velometer

_____ Thermocouple #1

_____ Thermocouple #2

_____ Manometer fluid

_____ Phototachometer

_____ Hand-held tachometer #1

_____ Hand-held tachometer #2

_____ Clamp-on ammeter

_____ Stopwatch

_____ Fyrite test kit

_____ Gastec detector kit

_____ Aerodyne cyclone model

_____ EPA method 6 standards

_____ Dial thermometer

_____ pH meter

_____ pH paper

_____ Spare pitot tube fittings

_____ Plastic tubing

_____ Water bottles

SAFETY GEAR

_____ BioMarine #1

_____ BioMarine #2

_____ Spare O_2 bottles

_____ Gas bottle manifold

_____ MSA #1

_____ MSA #2

_____ 3M dust/mist masks

_____ Work gloves

_____ Spare soda-sorb

_____ Spare MSA cartridges

_____ Leak-check ampoules

_____ Hard hats

_____ Safety glasses/goggles

_____ Ear protectors

_____ Safety harness

_____ NIOSH Hazardous Chemicals Handbook

Preceding page blank

TOOL KIT

_____ Tool box #1
_____ Tool box #2
_____ 6-volt lantern
_____ Flashlight
_____ Wire brush
_____ Duct tape
_____ Hammer
_____ Adjustable C-wrench
_____ Pry bar
_____ Extension cord

_____ Phillips screw driver
_____ Flat screw driver
_____ Brass rods
_____ Siphon
_____ 50 ft tape measure
_____ 12 ft tape measure
_____ Rope
_____ Snoop leak detector
_____ Bucket

OFFICE SUPPLIES

_____ Credentials
_____ Calling cards
_____ Confidential stamp and ink pad
_____ Project file documents, reference books
_____ Field note books
_____ Data sheets
_____ Paper (lined, plain, graph)
_____ Pens
_____ Pencils
_____ Liquid paper

_____ Scissors
_____ Stapler
_____ Paper clips
_____ Ruler (straight-edge)
_____ Clipboards
_____ Time sheets
_____ Expense forms
_____ Calculator
_____ Erasures

SHIPPING MATERIALS

_____ Foot locker
_____ Packing materials
_____ "Fragile" stickers

_____ Fiberglass tape
_____ Address labels

Equipment packed by: ______________________________
(signature)

Date: ______________________________

APPENDIX H

RECOMMENDED TARGETING PLAN

TABLE H-1. TARGETING PLAN FOR REGION II

Company	No.	Sources	Inspection Level	Inspection Frequency/yr
Adams Construction	20032		3	1
			2	1
Catawba Hospital	20590		3	1 (T)[a]
			2	3
General Electric	20592	Painting	0	1
		Boiler (2)	1	1
		Grit blast	3	1
			2	3
		Shot blast	3	1
			2	2
		Bake oven	0	1
Koppers	20544	Creosote	1	2
		Wood boiler	3	1
			2	3
		Boiler (2)	1	1
		Sawing	2	2
Marathon Oil	20995		0	1
Mohawk Rubber	20123	Boiler (3)	1	2
		Mixer	3	1
			2	2
		Buffer	3	1
			2	2
General Shale	20529	Kiln	1	2
		Screening	3	1
			2	2
		Crushing	1	2
Old Virginia Brick		Sand drying	3	1
			2	3
		Kiln (2)	1	2
		Predryer (2)	1	1
		Grinding	3	1
			2	3

(continued)

Preceding page blank

TABLE H-1 (continued)

Company	No.	Sources	Inspection	
			Level	Frequency/yr
V.A. Hospital		Boiler (4)	1	1
		Incinerator	3 2	1 3
Salem Incinerator	20957		3	3
L.H. Sawyer Paving	20883		3 2	2 2
Southern State Mill	20448	Process	2	2
		Boiler	1	2
Shell Oil	20397		0	1
Roanoke Foundry	20698	Cupola	3 2	1 3
Salem Stone	20461		2	2
National Gypsum (Gold Bond)	20225	Kiln 1	3	4
		Kiln 2	3	4
		Kiln 3	3	4
		Raymond mill (2)	3	4
		Bulk loading	3	4
Wolverine Fabricating	20763	Incinerator	3 1	1 2
		Boiler	1	1
Virginia Lime	20878	Dryer	3 2	1 3
		Processing	3 2	1 3

(continued)

TABLE H-1 (continued)

Company	No.	Sources	Inspection Level	Inspection Frequency/yr
Virginia Lime	20341	Kiln 1	3 2	1 3
		Kiln 2	3 2	1 3
		Kiln 3	3 2	1 3
		Precrusher	2	3
		Secondary crusher	2	3
VPI	20124	Boiler 6	3 1	1 1
		Boiler 7	3 1	1 1
		Boiler 8	3 1	1 1
		Boiler 9	3 1	1 1
		Boiler 10	3 1	1 1
Adams Construction	20033		3 2	1 1
Appalachian Power	10460	Boiler 6	3	3 1 (T)[a]
		Boiler 51	3 4	3 1 (T)[a]
		Boiler 52	3 4	3 1 (T)[a]
Celanese Fibers		Boiler 7	4 3	1 (T)[a] 3
		Gas boiler	1	1
		Acetate dryer	2	3
		Conveying	3 2	1 2
		Solvent system	2	3

(continued)

TABLE H-1 (continued)

Company	No.	Sources	Inspection Level	Inspection Frequency/yr
American Safety Razor	20189	Boiler (2)	1	2
		Wash (3)	1	2
		Trichloroethylene still	2	2
		Degreaser	2	2
		Coating	1	2
		Plating	3	1
			2	1
		Incinerator	1	2
Blakemore Construction	20039		3	1
			2	1
Crompton	20413	Boiler (5)	1	1
		Tenter (7)	2	1
		Singe (3)	2	1
DuPont	20517	Boiler (4)	3	1 (T)[a]
			2	3
		Boiler (1)	3	1 (T)[a]
			2	3
		Dryer (4)	1	2
		Fluidized bed	2	2
		Evaporator (4)	2	2
		Heat exchanger (4)	2	2
		Cat. oxidation (3)	2	2
		Adipic acid	3	1
		Unloading and transfer	2	1
		Adipic acid bin	3	1
			2	1
Elkton Limestone	20018		2	3

(continued)

TABLE H-1 (continued)

Company	No.	Sources	Inspection Level	Inspection Frequency/yr
Elkton Asphalt	20085		3 2	1 1
Ethan Allen	20548	Boiler	3 2	1 1
		Baghouse (4)	3	2
		Paint (3)	0	1
Farrier Paving	20025		3 2	1 1
Moore Bros.	20027		3 2	1 1
Mandy Quarry	20208	Boiler	1	1
		Dryer	3 2	1 1
		Mill	3 2	1 1
		Jaw crusher	2	2
		Screen	2	2
		Secondary crusher	2	2
		Screen	2	2
		Tertiary crusher	2	2
Quality Feed	20771	Boiler (2)	1	1
		Mixing	1	1
		Pelleting	1	1
Reynolds Metals	20515	Coal boiler (2)	3 2	1 3
		Oil boiler (2)	1	2
		Extruder	1	2
		Solvent rec.	0	1

(continued)

TABLE H-1 (continued)

Company	No.	Sources	Inspection Level	Inspection Frequency/yr
Rocco	20087	Pellet mill	1	1
		Hammer mill (3)	1	1
		Boiler (2)	1	1
Rockingham Milling	20513	Boiler	1	1
		Milling	1	1
		Pelleting	1	1
Rockingham Poultry		Boiler (5)	1	1
		Hammermill	1	1
		Pellet coolers	1	1
		Silos	1	1
Stanley Furniture	20480	Wood boiler (2)	3 1	1 1
		Oil boiler	1	1
		Fuel bin (3)	3 2	1 1
		Wood working (6)	3 2	1 1
Stauton Limestone	20794	Primary crusher	1 2	1 1
		Cage mill	1 2	1 1
		Screen (4)	1 2	1 1
		Hammer mill (3)	3 2	1 1
		Screen (BH)	3 2	1 1
		Cage mill (BH)	3 2	1 1

(continued)

TABLE H-1 (continued)

Company	No.	Sources	Inspection	
			Level	Frequency/yr
Merck and Co.	20524	Incinerator	1	1
			2	1
		Underfeed boiler (2)	3	1
			2	1
		Boiler	2	2
		Oil boiler	1	1
		Sludge incinerator	3	1
			2	1
		Process: SC 535	2	2
		DC 729	2	2
		D 927	2	2
		DC 301	2	2
		CV 201	2	2
		CV 401	2	2
		CV 901	2	2
		DC 101	2	2
		DC 102	2	2
		SE 101	2	2
		SE 102	2	2
		DC 701	2	2
Frazier Quarry	20005	Primary crusher	2	2
		Silo	2	2
		Screens	2	2
		Pug mill	2	2
		Secondary crusher	3	1
			2	1
		Tertiary crusher	2	2
Frazier Quarry	20919	Limestone	3	1
			2	2
		Primary crusher	2	2
		Screens	2	2
		Secondary crusher	2	2
Johnson Construction	20912		3	1
			2	2

(continued)

TABLE H-1 (continued)

Company	No.	Sources	Inspection Level	Inspection Frequency/yr
M. A. Layman	20038		3 2	1 2
M. A. Layman	20026		3 2	1 2
James Madison	20117	Coal boiler (2)	3 2	1 1
		Oil boilers	1	1
Virginia Metal	20518	Furnace iron	3 2	1 1
		Furnace bronze	3 2	1 1
		Degreaser	0	1
		Paint booth	0	1
		Metal polish	1	1
		Metal buffing	1	1
Wampler Foods	20553	Boilers	1	1
		Truck loading	2	2
		Grinding	2	2
		Mixing	2	2
		Pelletizing	2	2
West Sand & Gravel	20982	Crushing	2	2
		Screen	2	2
Western State Hospital	20412	Coal boiler (3)	3 2	1 1
		Oil boiler (3)	1	2
		Incinerator	1	2

(continued)

TABLE H-1 (continued)

Company	No.	Sources	Inspection Level	Inspection Frequency/yr
Lynchburg Foundry	20381	70 cupola	3 2	1 3
		M1 A mold sand	3 2	1 3
		M1 B shake out	3 2	1 3
		M1 C sand cooler	3 2	1 3
		M1 D sand muller	3 2	1 3
		M2 A blasting	3 2	1 3
		M2 B sand elevator	3 2	1 3
		M3 core grinder	3 2	1 3
		M4 bin vents	3 2	1 3
		9A/9B mullers	3 2	1 3
		36 sand furnace	3 2	1 3
		40 shell cupola	3 2	1 3
		70 special cupola	3 2	1 3
		1-6/7A grinding	3 2	1 3
		7 shake out	3 2	1 3
		8A-D/9A-C sand muller	3 2	1 3
		10 shot handling	3 2	1 3
		11 shell sand	3 2	1 3
		12 shell loop	3 2	1 3

(continued)

TABLE H-1 (continued)

Company	No.	Sources	Inspection Level	Inspection Frequency/yr
Lynchburg Foundry (continued)		36 sand furnace	3 2	1 3
		62A cement mixing	3 2	1 3
		62B/C pipe grinding	3 2	1 3
		64,65 sand silo	3 2	1 3
		91-92 core silos	3 2	1 3
		81 shot blast	3 2	1 3
		M2A blast cleaning	3 2	1 3
		M1A/M1D MCF molding	3 2	1 3
		M2B/M3 sand elevator	3 2	1 3
Sisson & Ryan	20796	Asphalt plant	3 2	1 3
		Primary crusher	2	2
		Secondary crusher	2	2
		Tertiary crusher	2	2
Adams Construction	20037		3 2	1 1
Adams Construction	20036		3 2	1 1
Barger & Son	20116		1	2
Burlington Industry		Coal boiler (7)	3 2	1 3
		Oil boiler (6)	1	3
		Tenter (6)	1	4

(continued)

TABLE H-1 (continued)

Company	No.	Sources	Inspection	
			Level	Frequency/yr
C&O R.R.	20576		3	1
			2	3
City of Covington	20119		2	2
Lane Jack Quarry	20471	Primary crusher	2	2
		Secondary crusher	2	2
		Cage mill	3	1
			2	1
		Screen	2	2
Lone Jack Limestone	20021		3	1
			2	1
Pantasote		Boiler (3)	1	2
		Mixer	3	1
			2	1
		Pelletizer	3	1
			2	1
		Buffing	2	1
			1	1
Rea Wire	20655	Enameling (2)	3	1
			2	1
		Plasimica	3	1
			2	1
		SICME	3	1
			2	1
Reeves Bros.	10516	Boiler (4)	1	1
		Spreader	1	1
		Dusting	3	1
Taylor Ramsey	20438	Wood boiler (2)	3	1
			2	1
		Oil boiler (2)	3	1
			2	1

(continued)

TABLE H-1 (continued)

Company	No.	Sources	Inspection Level	Inspection Frequency/yr
VEPCO	20675		1	1
Weblite Corp.	20340		3 2	1 3
Webster Brick	20447	Grinding	3 2	1 1
		Kiln (2)	1	2
		Color	3 2	1 1
General Shale	20529	Sand	3 2	1 1
		Kiln	1	2
Georgia Bonded	20342	Coal boiler (3)	3 2	1 1
Hermitite Corp.	20077	Boiler	1	1
		Printing	0	1
James River Lime	20459	Mills	3 2	1 3
		Storage	3 2	1 3
James River Lime	20320	Crusher	3 2	1 3
		Mills	3 2	1 3
		Bagging	3 2	1 3
James River Lime	20569	Raymond mill	3 2	1 3
Virginia Hot Springs	20828	Boiler (3)	3 2	1 3

(continued)

TABLE H-1 (continued)

Company	No.	Sources	Inspection	
			Level	Frequency/yr
Blue Ridge Stone		Primary crusher	2	2
		Secondary crusher	2	2
		Sand screen	3 2	1 1
		Lime	3 2	1 1
Bond Cote	20526	Oven	1	2
ACCO Stone	20484	Fines crusher	3 2	1 2
		Screen	3 2	1 2
Blacksburg Incinerator	20911		3 2	1 1
Burlington Industry	20271	Coal boiler	3 2	1 1
		Oil boiler	2	2
		Tenter (10)	1	2
Coleman Furniture	20300	Boiler	3 2	1 3
		Cyclones	2	4
Cupp Black Top	20022		3 2	1 1
Exxon	20991		0	1
Gallimore Paving			3 2	1 1
Harris Hardwood	20451	Boiler (3)	3 2	1 3
		Cyclones	2	2

(continued)

TABLE H-1 (continued)

Company	No.	Sources	Inspection Level	Inspection Frequency/yr
Hercules	20510	Boiler	1	2
		Melt spin (4)	3 2	1 1
		Film extrusion	3 2	1 1
		Melt (7)	3 2	1 1
Hercules	20322	Iron dryer (2)	3 2	1 3
		Packer	3 2	1 3
		Lime	3 2	1 3
		Housekeeping	3 2	1 3
Hoover Color	20321	Boiler	1	3
		Calcining	3 2	1 3
		Mill	3 2	1 3
		Storage	3 2	1 3
Reliance Universal	20469		1	1
Lonestar		Kiln 1	3 4	3 1 (T)[a]
		Kiln 2	3 4	3 1 (T)[a]
		Kiln 3	4 3	1 (T)[a] 3
		Kiln 4	4 3	1 (T)[a] 3
		Kiln 5	4 3	1 (T)[a] 3

(continued)

TABLE H-1 (continued)

Company	No.	Sources	Inspection	
			Level	Frequency/yr
Lonestar (continued)		Primary crusher	3 2	1 3
		Cone crusher	3 2	1 3
		Raw mill	3 4	3 1 (T)[a]
		Finish mill (9)	3	4
		Cooler (4)	3	4
		Packing (6)	3 2	1 3
		Finish silo (10)	3 2	1 3
		Miscellaneous baghouses	3 2	1 3
Singer Furniture		Boiler	3 2	1 3
		Sanding	3 2	1 3
		Cyclones	2	4
		Painting, etc.	0	1
Roanoke Electric	20131	Furnace 2	3 2	1 3
		Furnace 3	3 2	1 3
		Furnace 4	3 2	1 3
Radford Limestone	20431	Primary crusher	2	2
		Secondary crusher	2	2
Radford Limestone	20433	Primary crusher	2	2
		Secondary crusher	2	2
		Tertiary crusher	2	2
		Fines	2	2

(continued)

TABLE H-1 (continued)

Company	No.	Sources	Inspection	
			Level	Frequency/yr
Radford Limestone	20433	Primary crusher	2	2
		Secondary crusher	2	2
		Tertiary crusher	2	2
Westvaco		Regenerator	3	4
		Devolatilizing kiln	3	4
		Carbon incinerator	3	1
			2	3
		Coal prep.	3	4
		Granular prep.	3	4
		Granular finishing	3	4
		Fluid bed oxidizer	3	4
		Kiln scrubbers 1 and 2	3	4
		Kiln 1	3	4
		Granular storage, screening, grinding, and powder carbon storage	3	4
		Bulk conveying, packaging	3	4
Westvaco	20328	Boiler 6	3	3
			4	1 (T)[a]
		Boiler 7	3	3
			4	1 (T)[a]
		Boiler 8	3	3
			4	1 (T)[a]
		Boiler 9	4	1 (T)[a]
			3	4
		Lime kiln	4	1 (T)[a]
			3	3
		Calciner	4	1 (T)[a]
			3	3
		Recovery boiler 1	4	1 (T)[a]
			3	3
		Slakers (3)	2	4

(continued)

TABLE H-1 (continued)

Company	No.	Sources	Inspection	
			Type	Frequency/yr
Westvaco (continued)		Smelt tanks (2)	2	4
		Blow tanks, relief accumulators	2	2
Mennel Milling	20711	Boiler	1	1
		Silos (5)	3	1
			2	1
Walker Machine	20334	Shot	3	1
			2	3
		Sand reclaim	3	1
			2	3
		Furnaces	1	4
Rockydal Quarry	20457	Crushing	3	1
			2	3
		Loading	3	1
			2	3
S.R. Draper Paving	20035		3	1
			2	1
Virginia Asphalt	20031		3	1
			2	1
Wells Furniture	20523	Boiler	3	1
			2	1
		Cyclones	2	2
N&W Railroad	20468	Boiler 3	3	1
			2	2
		Electric arc	3	1
			2	2
		Sand shake-out	3	1
			2	2
		Shot blast	3	1
			2	2

(continued)

TABLE H-1 (continued)

Company	No.	Sources	Inspection	
			Level	Frequency/yr
Pulsaki Furniture	20470	Sanders	3 2	1 2
		Cyclone	2	3
		Boiler	3 2	1 2
Pulsaki Furniture	20789	Boiler (3)	3 2	1 2
		Machine room	3 2	1 2
		Paint booths	0	1
		Machining finish	3 2	1 2
		Waste storage	3 2	1 2
		Cyclones	2	2

[a] (T) = stack test recommended.

APPENDIX I

EXAMPLE OF INSPECTION REPORTS PREPARED AS A RESULT OF IMPLEMETING MODIFIED INSPECTION PLAN

Example No. 1

An internal inspection of this gray iron cupola fabric filter was performed on this unit after an initial inspection of the unit revealed no static pressure was developing across the filter. When the plant manager and I entered the fabric filter, we were both amazed at the conditions that we found.

The following is a list of problems that we found in the unit:

1. Bags had holes in them.
2. Bags that had been replaced had simply been cut off and the new bag had been inserted in the old bag mount.
3. Bag shaker motors had been removed.
4. Water was leaking in the roof and sides of the baghouse.
5. Bags were not properly tensioned.
6. Manometers was broken.
7. Wet cyclone sprays were not operating allowing baghouse temperatures to reach 500°+F.
8. Emergency bypass system was welded shut so that the bag gases could not be bypassed.

As a result of this inspection, the plant called in a consultant to verify our findings. The consultant agreed with our findings and estimated the cost of repairs in excess of $25,000. At that time, company officials explained the company's current financial condition explaining that they were in bankruptcy and could not afford to maintain the unit. They also stated that if they were allowed some time, that they would replace the cupola with an electric furnace. As a result, the company applied for and received a variance of our opacity standards until January 1983, when they are to have electric furnaces installed.

Today, repairs on the cupola have been completed that allow the unit to operate within our opacity standard until the new electric furnaces are installed.

Preceding page blank

Example No. 2

During my first inspection at this source, I inspected both fabric filters handling emissions from three electric arc furnaces. The first fabric filter handling emissions from the number two and three furnaces was found to have several problems. They were:

1. Bags that had fallen from their mounts.
2. Hoppers that had overfilled causing bags to plug.
3. Improperly sealed bags.
4. Manometers that were not operating
5. Improperly calibrated amp and temperature readings.
6. Extremely low flow rates to the fabric filter.

These problems were reported to plant officials and corrective action was taken. Inspections performed on this fabric filter since that time have cited improved maintenance practices, but occasional problems still occur that our inspections find allowing the source to start corrective action.

The second fabric filter is handling emissions from the number four furnace and roof canopys. This fabric filter is also equipped with a multalclone precleaner that was designed to knock out larger particles to prevent bag damage. When I first inspected this control device, I found a 12 inch pressure drop across the multaclone. I investigated further found that the hoppers on this sytem were plugged and that the air lock was frozen. During that inspection we found that the baghouse was being well maintained and that amp and temperature reading being recorded by the company's instruments were fairly accurate.

We did however report to the source that a problem existed with the multaclone and we felt that corrective action should be taken.

During my next visit to the source, I found that the pressure drop across the multaclone had returned to normal conditions as designed. The only problem I found with the system, was that water was leaking in one of the bag compartments. At that inspection, this plant was listed as in compliance. The next inspection revealed that almost no pressure drop was occuring across the multaclone and problems had began to occur in the baghouse. Problems included:

1. bag seal leaks
2. holes in bags
3. bags loose from mounts

Example No. 2

Further investigation by our staff revealed that three rows of tubes in the multaclone had been removed and that many other tubes were to be removed. The source was cautioned at that time that while the multaclone was not considered a vital piece of control equipment, we felt that failure to maintain it would result in more maintenance on the number four filter. Since that time, the company has continued to remove multaclone tubes and maintenance on the number four filter has increased. We are now carefully observing this system and advising the company that no leniency will be given should the unit be found out of compliance.

APPENDIX J

LETTERS FROM INDUSTRY

JAMES RIVER LIMESTONE COMPANY, INC.
DOLOMITIC AND HIGH CALCIUM LIMESTONE

TELEPHONE
AREA CODE 703
254-1241

DRAWER 617
BUCHANAN, VIRGINIA
24066

November 27, 1981

RECEIVED
NOV 30 1981

Mr. Donald L. Shepherd
Director, Region II
State Air Pollution Control Board
5338 Peters Creek Road, Suite A
Roanoke, Virginia 24019

Dear Don:

On November 17, 1981, Mr. Owen Weigand of your office and Mr. Gary Saunders of PEDCO visited our Buchanan plants for a semi-annual inspection. In the course of their visit, they discussed in depth operating and maintenance problems of our baghouse collectors. It was determined that a slight problem exists in the seal of the bag lips.

In their discussion with our maintenance personnel a modification was proposed which might eliminate this problem. We intend to place this modification on one zone of our baghouse for a trial. If this should prove successful, we will modify the remaining baghouses. We will notify you of our findings.

Please convey my thanks to Mr. Weigand and Mr. Saunders for their timely suggestions.

Sincerely yours,

Paul English

Paul X. English, III
Director of Production Services

PXE,III:rc

SIX PRODUCING PLANTS
FOUR NEAR BUCHANAN, VIRGINIA • ONE NEAR WHEELING, WEST VIRGINIA • ONE NEAR JAMESTOWN, SOUTH CAROLINA

COMMONWEALTH of VIRGINIA

State Air Pollution Control Board

INTRA-AGENCY MEMORANDUM

TO : Files

FROM : Chemist, Region II

SUBJECT : National Gypsum (Baghouse: Maintenance)

DATE : January 26, 1982

During the visit to National Gypsum Co. on 1-25-82, Mr. T. Hayman informed me that there was a problem with their bag[1] suppliers meeting specifications.

He was surprised that the reason why bags were being installed upside down was because suppliers had the rings sewed into the wrong end. Again, he thanked our and PEDCO's efforts for bringing this[2] to their attention.

Unfortunately, they have many suppliers, and do not know which firm makes the error, however, they are beginning to inspect every shipment from this day forth, and will have the problem remedied.

1. bags for the baghouse
2. proper maintenance and operating procedures

RCM/vlc

SAPCB Form 15 (7/79)

Gold Bond Building Products
A National Gypsum Division

RECEIV
JAN 29 1982

January 28, 1982

Mr. Donald L. Shepherd
Director, Region II
State Air Pollution Control Board
Commonwealth of Virginia
5338 Peters Creek Road
Roanoke, Virginia 24019

Dear Mr. Shepherd:

We wish to express our thoughts on the activities of the State Air Pollution Control Board at Kimballton over the last few months.

Mr. Rick Moore, Chemist Region II, SAPCB has been working with Kimballton plant personnel towards improving our dust collection performance.

We have concentrated our efforts toward No. 3 kiln fiberglass bag house performance.

The objective is two fold:

a. to improve the day to day performance
b. to make more cost effective the existing collection equipment.

As a result of this program it was discovered that some glass bags were incorrectly installed, ie. upside down. Further investigation revealed this improper installation was due to the glass bag supplier fabricating the bottom ring of the individual bags in the top position rather than the bottom position just above the 12" cuff.

Baghouse inspection also showed evidence of workers abrading the bags with tools they apparently carry in their pockets during installation work.

These two examples are illustrated to highlight the value of SAPCB's program to a plant operating dust collecting equipment. These are simple items but they shorten bag life.

Kimballton Plant • State Route [illegible] • Ripplemead, Virginia • [illegible]

Several other items are under investigation; such as, dust buildup around tube sheet timbles, method of tieing off failed bags, corrosion scale abrading bags. These are under consideration for corrective action.

It is our interest and objective to maximize the performance of the dust collection equipment at Kimballton. Batter performance means cleaner air and secondly, we see an economic benefit of reduced maintenance cost.

We subscribe to the SAPCB's program and look forward to our continuing good relations.

Sincerely,

GOLD BOND BUILDING PRODUCTS
Division of National Gypsum Co.

T R Hayman

T. R. Hayman
Plant Manager

TRH/pc

cc: Mr. Robert J. Friedheim
Director - Environmental & Operating Services
Gold Bond Building Products
2001 Rexford Road
Charlotte, N. C. 28211

APPENDIX K

SUMMARY OF CHANGES IN INSPECTION PROCEDURES AS A RESULT OF THE STUDY

SUMMARY OF PAST AND PRESENT INSPECTION PROCEDURES BY SOURCE

Source GG. Past-recorded visible emissions and available gravel bed filter operating parameters; Present-measure additional parameters such as O_2 to determine inleakage, and include internal inspections.

Source EE. Past-recorded ESP electrical characterisitcs; Present-analyzing these data plus internal inspection.

Source II. Past-opacity; Present-all boiler parameters and internal inspection.

Source FF. Past-opacity; Present-all boiler and ESP parameters, plus internal inspection.

Source Q. Past-opacity; Present-baghouse parameters plus internal inspection.

Source O. Past-opacity; Present-baghouse parameters plus internal inspection and Δp.

Source P. Past-opacity. Present-boiler and baghouse parameters plus internal inspection.

Source G. Past-opacity and ESP parameters; Present-better interpretation of ESP parameters plus internal inspection of ESP's and baghouses.

Source V. Past-opacity and ESP parameters; Present-better interpretation of ESP parameters plus internal inspection of ESP's and multiclones.

Source S. Past-opacity; Present-boiler parameters plus internal inspection of baghouse and Δp.

Source L. Past-opacity; Present-internal baghouse inspection plus Δp.

Source J. Past-opacity; Present-boiler parameters.

Source H. Past-opacity; Present-internal baghouse inspection plus Δp.

Source B. Past-opacity; Present-internal baghouse inspection plus Δp.

Source BB. Past-opacity; Present-boiler parameters.

Source X. Past-opacity; Present-internal boiler inspection plus Δp.

Source Z. Past-opacity; Present-boiler parameters.

Source CC. Past-opacity; Present-boiler parameters.

Source E - Process 1. Past-opacity and scrubber temperature and Δp; Present-better understanding of operation plus internal inspection of baghouses.

Source E - Process 2. Past-opacity and ESP data; Present-scrubber and boiler parameters and internal inspections of boilers and ESP's.

Source U. Past-opacity; Present-internal inspection of scrubbers and baghouses.

Source JJ. Past-opacity; Present-baghouse parameters plus internal inspection.

Source F. Past-opacity; Present-boiler parameters plus internal inspection of multiclone.

Source M. Past-opacity; Present-boiler and baghouse parameters plus internal inspection.

Source N. Past-opacity; Present-boiler and baghouse parameters plus internal inspection.

APPENDIX L

LETTERS FROM REGIONAL DIRECTOR AND DIRECTOR OF COMPLIANCE

ELIZABETH H. HASKELL, CHAIRMAN
MARTINSVILLE
CARL C. REDINGER, VICE CHAIRMAN
ALEXANDRIA
EDGAR B. BOYNTON
RICHMOND
AXEL T. MATTSON
YORKTOWN
WALLACE E. REED
CHARLOTTESVILLE

COMMONWEALTH of VIRGINIA
State Air Pollution Control Board
Valley of Virginia Regional Office
SUITE A, EXECUTIVE OFFICE PARK
5338 PETERS CREEK ROAD
ROANOKE, VIRGINIA 24019
PHONE (703) 982-7328

DONALD L. SHEPHERD
REGIONAL DIRECTOR

October 22, 1982

Mr. Ronald L. Hawks
PEDCo Environmental, Inc.
505 South Duke St.
Suite 503
Durham, NC 27701

Dear Ron:

Enclosed are summaries of preliminary results of your source inspection training program. Even though we have only begun to utilize the potential of these techniques, the results have been dramatic.

At this stage we have primarily investigated existing control equipment, since we believe that the great majority of our sources already have all the control equipment necessary for compliance. Even though you had warned us to expect problems with the majority of our control equipment, we have been surprised at the widespread extent of these problems, and so has industry. At a recent staff meeting our"gut" estimate was that about 80% of the control of the control equipment we have inspected has some problem that could eventually lead to non-compliance.

With one exception the industries where we have used the advance inspection techniques have been receptive. Typically, an industry is first skeptical, believing that their control equipment is operating as well as it can. Their next reaction is usually shock or embarrassment when developing problems are pointed out. Finally, they will express their gratitude for being shown the problem before it becomes worse; at this point most resolve to repair the problem and/or improve their maintenance programs. In general, by demonstrating an increased knowledge and interest on our part, we also gain increased respect from the industry. By emphasizing the cooperative, nonpunitive approach, we have minimized any sense by industry that they are being unduly harassed.

Our next step in utilizing this training is to identify sources where existing controls, no matter how well maintained and operated, are simply not adequate.

Preceding page blank

Along with the training we have also revised our plan for scheduling inspections. This plan (attached) is aimed at putting more emphasis on our more serious problem sources, or those sources with the greatest potential to cause a problem. To accomodate the increased time required to make an in-depth inspection, the total number of major source inspections has been reduced. However, we believe that this loss in quantity will be more offset by gains in quality of inspections.

In the near future, I also plan to improve our reporting and record-keeping system such that our inspection reports will be more meaningful and our files more useful.

In summation, although this training has not resulted in a rash of citations or massive investment in control equipment, it has improved our understanding of how control equipment works in the real world. If anything, it has also improved our relations with most industries, since they now see us more as partners in the continuing effort to insure that their costly investments in pollution controls actually produce the cleaner air that we have all paid for.

Quite simply, in my 10½ years in air pollution control, this is the most valuable training I have received.

Sincerely,

Don

Donald L. Shepherd
Director, Region II

P.S. My only criticism is that we are still awaiting your reports of your inspections.

cc: Executive Director
Director, Division of Compliance

CMP-098-82

E. FOLGER TAYLOR, CHAIRMAN
STAUNTON

ELIZABETH H. HASKELL, VICE CHAIRMAN
MARTINSVILLE

EDGAR B. BOYNTON
RICHMOND

AXEL T. MATTSON
YORKTOWN

CARL C. REDINGER
ALEXANDRIA

COMMONWEALTH of VIRGINIA
State Air Pollution Control Board
ROOM 1106, NINTH STREET OFFICE BUILDING
RICHMOND, VIRGINIA 23219
TELEPHONE: (804) 786-2378

W. R. MEYER
EXECUTIVE DIRECTOR

March 17, 1982

Mr. Abraham Ferdas
Chief, General Enforcement Section
U.S. EPA - Region III
6th & Walnut Streets
Philadelphia, PA 19106

Dear Abe,

Yesterday the field portion of our inspector training was started in our Regions III and V. As you know Ron Hawks, Gary Saunders and others from PedCo conducted the academic training for 6 of our 7 regions in December. Gary and Ron are performing the field training as they did with the pilot program in our Region II last fall.

So far the training has proved to be most beneficial. The academic training was very concentrated and many of our people have spent considerable time since the formal instruction in expanding their knowledge of various types of control equipment. All of the regional people are looking forward to the field training because of the fine reports coming from Don Shepherd in our Region II Office. The Region II inspectors have experienced quite a bit of success in working with industry on improving the maintenance and operation of its air pollution control equipment.

We expect that the success enjoyed by our Region II staff in conducting technical inspections will be repeated in the other regions with a resulting improvement in the operation of control equipment throughout the state. The methods being taught by PedCo of inspecting and providing assistance to industry fit Virginia's style of enforcement activity so that the air will be cleaner and the SAPCB image will be enhanced simultaneously.

Abe we particularly appreciate the support of the EPA, Region III staff with this training venture. Your assistance has proved to be invaluable in giving our continuous compliance program a good start.

Best personal regards,

Bill

William M. Jewell, Jr.
Director, Division of Compliance

APPENDIX M

SELECTED CASE HISTORIES

CASE HISTORY PLANT G

Plant G operates a major portland cement facility that includes kilns, clinker coolers, raw grinding mills, and associated handling equipment. The kilns are controlled by ESP's, the clinker coolers by fabric filters, and the raw mill by an ESP.

A Level 3 inspection of the four ESP's serving Kilns 1 through 4 indicated that the gas volumes being handled were very high because of ambient air inleakage between kiln and collector. The design gas volume is about 190,000 acfm at 500°F. During the inspection, the gas volume was estimated to be approximately 350,000 to 400,000 acfm. The flue gas oxygen was between 9 and 14 percent at kiln inlet and between 1 and 3 percent at the exit.

As a result of the inleakage and high superficial velocities, the ESP efficiency was reduced. The opacity of the kiln emissions has exceeded 20 percent and the corona power is generally low. The plant has rebuilt the evaporative coolers between the kiln and ESP to reduce inleakage, and the gas volume has been reduced. Internal inspections of the ESP's indicated distribution screen pluggage and gas maldistribution. These have been corrected through improved rapping.

A Level 3 inspection was conducted on the clinker cooler fabric filter serving Kilns 1 through 4. An internal inspection indicated clean-side particulate penetration as a result of gasket failure between the venturi and the tube sheet. The gaskets are made of a rubber-based material that can operate at temperatures less than 350°F. Temperatures in the filter have often exceeded 400°F because no fail-safe high-temperature alarms are used. Replacement of the tube sheet was required because of abrasive damage around the gasket seat. Corrections have been made to one of the four collectors and the others are being corrected.

A Level 3 inspection was conducted on the ESP serving the raw mill and Kiln 5. The corona power to the unit was lower than normal (i.e., 30%

Preceding page blank

of the normal value). Discussions with the plant and further investigations indicated that the evaporative cooling water pumps serving the unit were out of service and had been out for an extended period of time. This water failure resulted in a high resistivity condition in the ESP, which lowered the corona power that could be delivered to the collector and reduced ESP performance. Normal secondary currents in the last field are about 1500 mA, but they were reduced to approximately 70 mA during periods of high resistivity. The plant agreed to replace the defective pumps and to restore the unit to its proper operating levels.

CASE HISTORY PLANT Q

Plant Q operates three electric arc furnaces, which are controlled by fabric filters. Furnaces 2 and 3 are controlled by side-draft hoods that are vented to an eight-compartment, shaker-type fabric filter. The filter has a cloth area of 67,600 ft^2 and a design gas volume of 163,500 acfm at $275^{\circ}F$. The design air-to-cloth ratio is 2.4 $acfm/ft^2$. During a Level 3 inspection it was determined that isolation dampers between inlet plenum and several compartments were not functioning and that the bags were not being cleaned. The pressure drop across the fabric filter was quite high (>7.0 in. H_2O) and as a result, several bags had dropped because of the heavy weight of the dust cake.

It was also noted that the electric arc furnace filter had to be bypassed or the furnace shut down to effect filter shaking. During subsequent inspections it was noted that the filter hoppers were being used for storage. Because the hopper was not insulated, bridging frequently occurred. This allowed the hoppers to overfill and block a portion of the filter area from service. As a result of these findings, the plant has corrected the deficiencies in the dampers, hoppers, temperature instruments, and manometers. These corrections have improved the side-draft hood capture and reduced the fugitive emissions. Maintenance requirements on the filter have been reduced as a result of improved bag cleaning and reduced hopper bridging.

Furnace 3 is controlled by a fabric filter, which is preceded by a multicyclone. The ventilation system consists of a fourth hole furnace evacuation system and a canopy hood. The canopy hood is used during tapping and charging.

Fabric Filter 3 has 11 compartments with a total cloth area of 60,830 ft^2. At a design flue gas volume of 157,000 acfm, the filter has an air-to-cloth ratio of 2.5 $acfm/ft^2$.

During a Level 3 inspection the gas volume being handled from the hoods was calculated to be 97,000 acfm, which was 40 percent less than design values, and fugitive emissions were observed from the shop area. Further investigations indicated that the multicyclone pressure drop was 7.0 in. H_2O, which was much higher than the design value of 2.0 in. H_2O. It was determined that the multicyclone hopper was plugged and the system had not been emptied in 6 months.

The company has corrected the multicyclone hopper problem, and the gas flow has been increased to about 187,000 acfm. To further increase the hood capture, the plant has removed the multicyclone tubes. This has increased the bag failure rate in the filter because of increased abrasion. Thus, the removal of the multicyclone has not been a viable alternative for improving the overall capture efficiency.

Visible emission violations have been documented during periods of poor hood performance, and the source has been issued an NOV to correct the problems with the ventilation system.

Complaints from neighbors in the area have been correlated with excess emission periods, and in one case, an ambient violation of the 24-hour total suspended particulate standard was recorded at an adjacent monitor.